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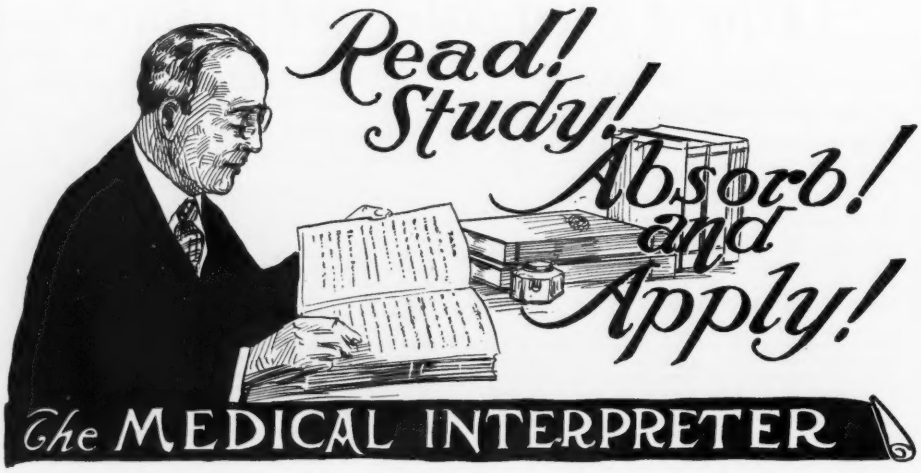

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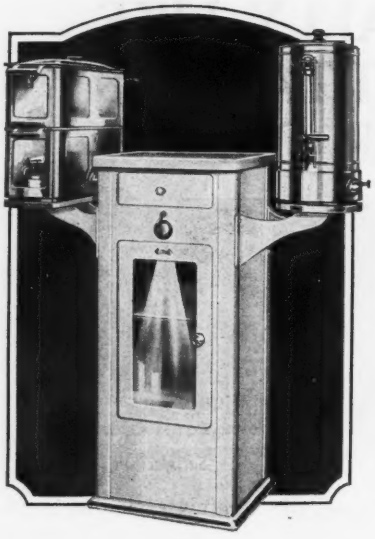

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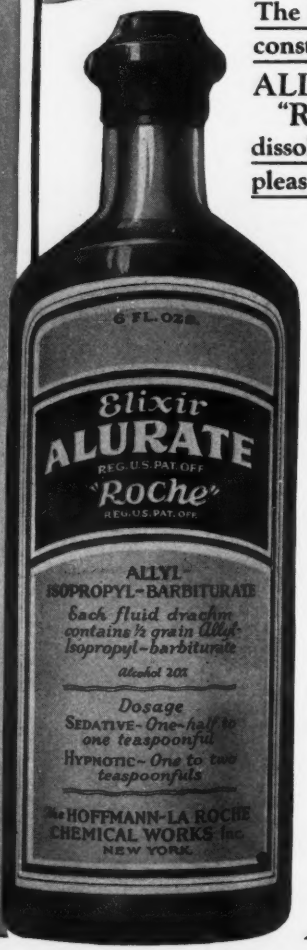

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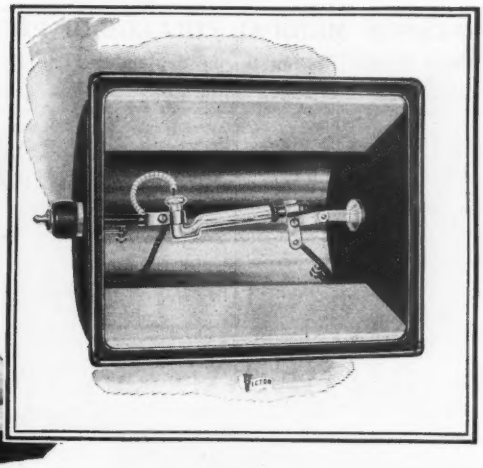

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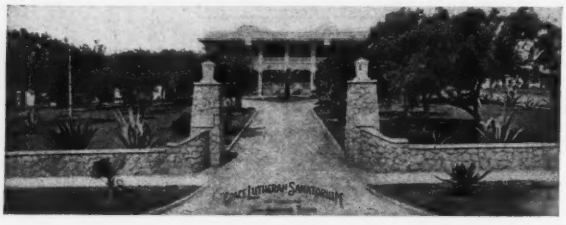

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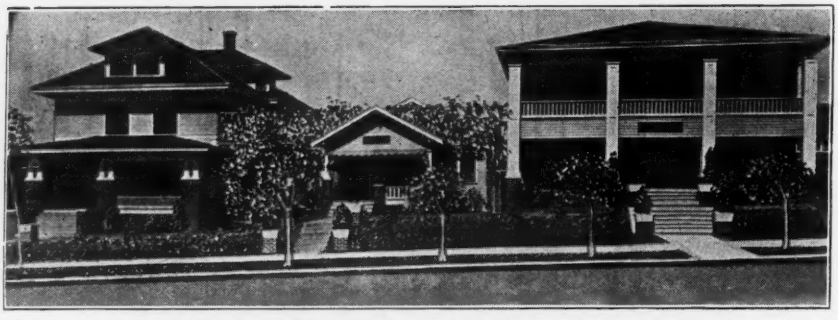

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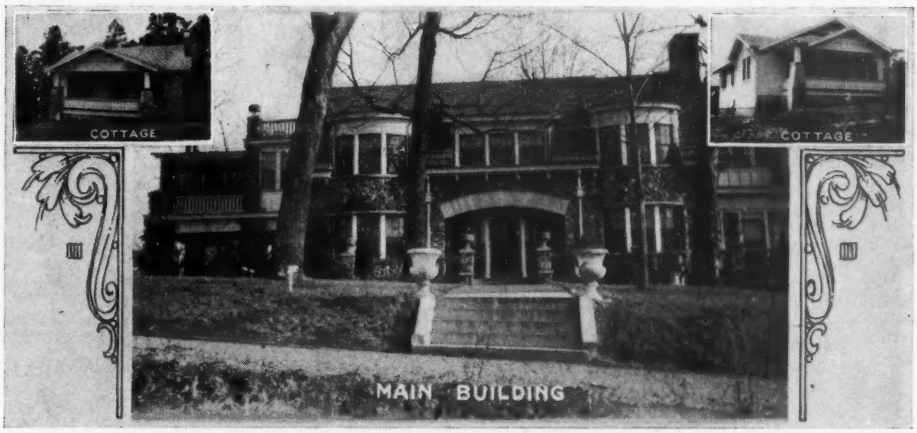

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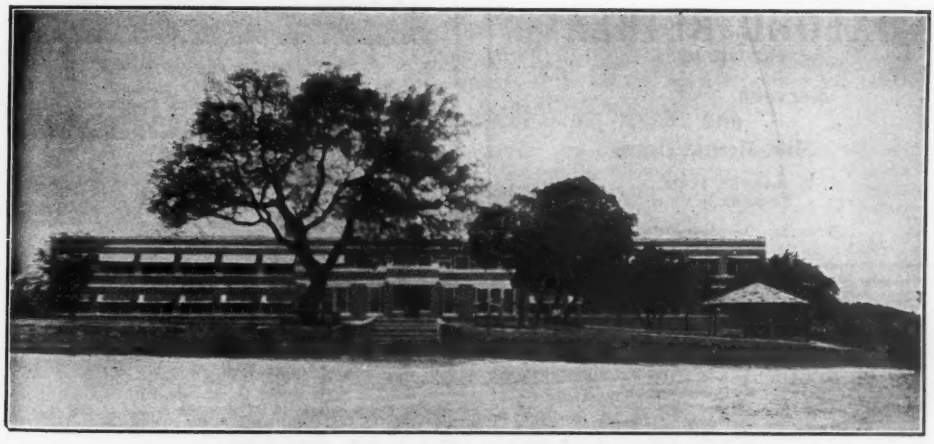

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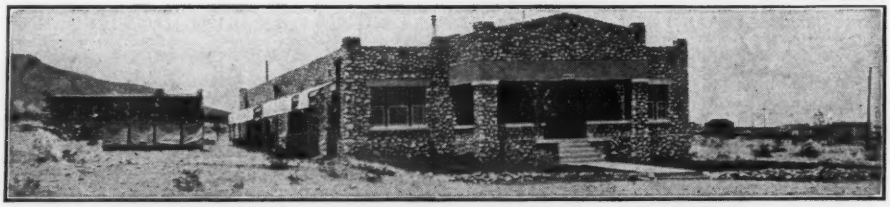

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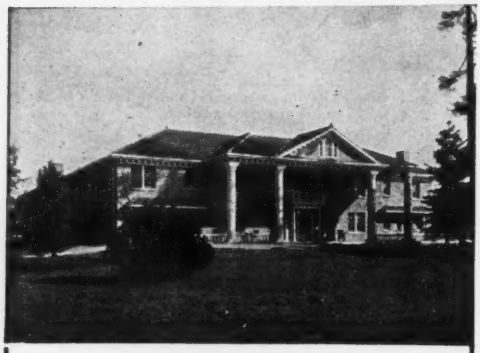

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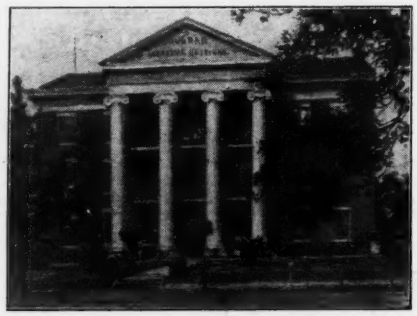

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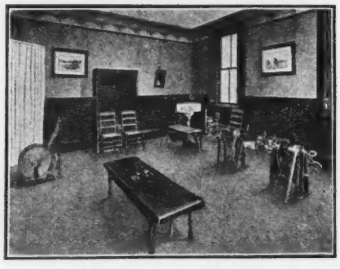

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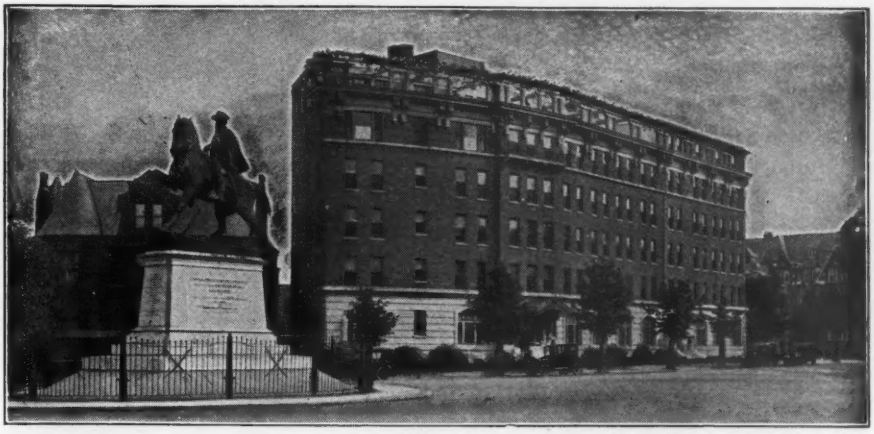

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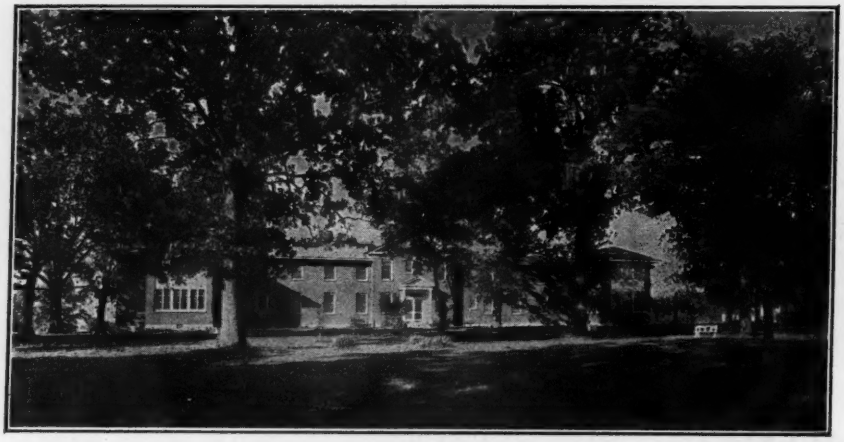

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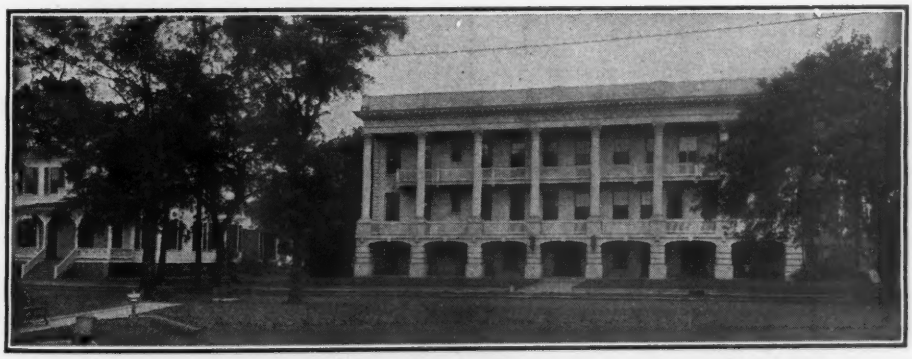

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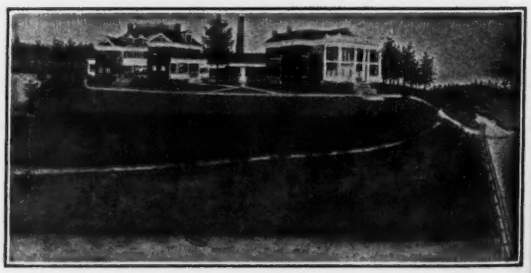

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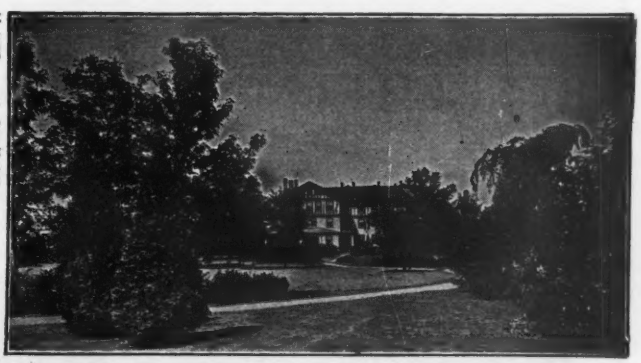

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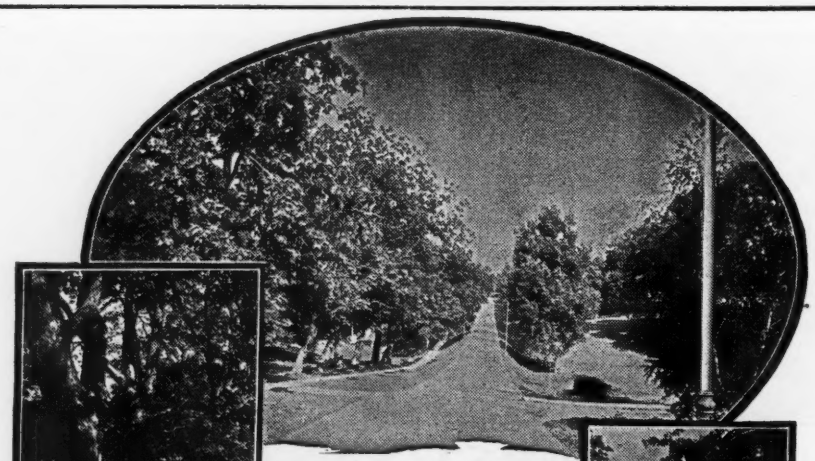

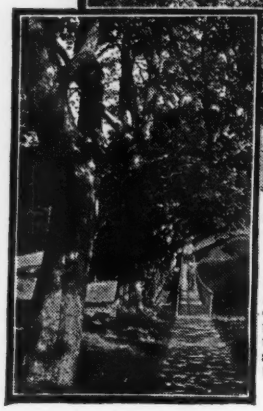

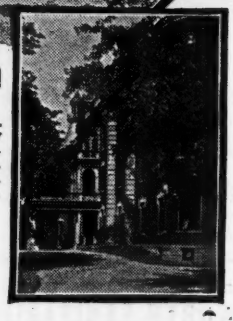

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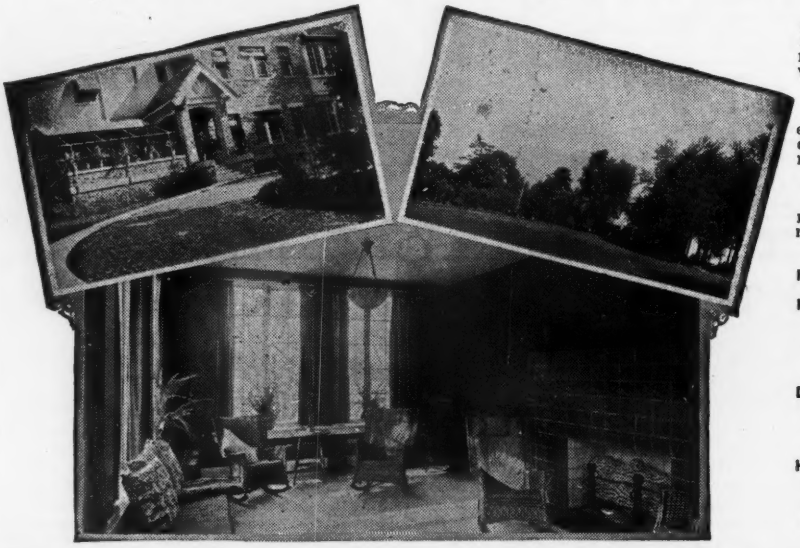

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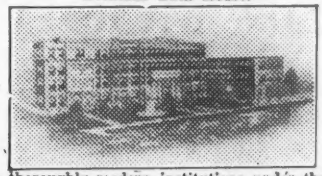

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Volume XX JUNE 1927 Number 6

LESIONS OF THE BLOOD VESSELS OF THE EXTREMITIES*

By DEAN LEWIS, M.D.,
Baltimore, Md.

Victor Francois of Mons said, in 1832, that everything concerning spontaneous gangrene of the extremities was in a state of distressing uncertainty. During the time that has elapsed since this statement was made, lesions affecting the arteries have been well differentiated as the result of pathological and experimental studies, and the clinical syndromes associated with them have become fairly well recognized. It may be said, however, without much fear of contradiction, that most things concerning the etiology of the changes in the vessels leading to spontaneous gangrene, and that many things concerning the treatment of the results of these are still in a state of distressing uncertainty.

Clinically, spontaneous gangrene is recognized in the old, and in the young, and is usually dependent upon different changes in the vessels. It will be of advantage to discuss these first.

According to Marchand, the term arteriosclerosis includes all those changes occurring in an artery which lead to a thickening, especially of the intima, to degenerative changes (fatty degeneration); sclerosis and calcification (including calcification of the media); also inflammatory and productive processes. Dupuytren was evidently the first to direct attention to the possibility of an inflammation of arteries, a true arteritis. It is just possible that Roches preceded him in this, but Dupuytren is usually given the credit.

Changes in Vessels in Arterial Disease.—Clinicians and pathologists have different criteria regarding arteriosclerosis. To the clinician arteriosclerosis indicates a rigid, non-compressible, pipe-stem-like artery. The pathologist, on the other hand, concerns himself with the earlier changes of proliferation followed by degeneration, or the reverse. It is generally recognized that in arteriosclerosis the principal changes occur in the intima and media, but in the advanced cases the adventitia may also be affected. There is no unanimitiy of opinion, however, as to the sequence of these changes. While some regard the changes in the media or internal elastic lamina as primary, and those of the intima as secondary, others think the reverse. These differences of opinion may be in part due to variability in the arrangement of the musculature and elastic tissue in different parts of the arterial tree. Differences are noted in different arteries, and the structure of the wall at the same point in a given artery may vary in different individuals.

MacCallum states that at the inner margin of the media one can generally distinguish a musculo-elastic layer, which in its most typical form is composed of an outer, single, smooth lamina of elastic tissue, a layer of longitudinal muscle fibers and an inner layer of elastic tissue less simple in formation than the outer and clearly made up of a network of fibers or laminae. There is apparently a chemical difference between the two, for the outer stains red when the inner fibers stain blue; or a brownish red when the inner stain purple. In the smaller vessels, this inner layer is frequently in close contact with the endothelium. The internal elastic lamella offers no obstacle to the extension of the tissue changes into the intima, and it is probably incorrect to regard all the tissue found in the thickened intima as originating in it.

Thoma's views and those of his pupils regarding arteriosclerosis have not been confirmed. They have largely been discredited by later work. He believed that the changes were due to loss of elasticity in the internal elastic membrane, which in different places became converted into scar tissue, and that the intimal

*Oration on Surgery, Southern Medical Association. Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

Fig. 1
Arterial pattern in normal leg and foot after injection of arteries.

proliferation was largely compensatory, which might repair tears in the intima and prevent to some extent aneurysm formation. It is probable that a gradual development of the intima, with some increase in the elastic tissue, occurs from youth to maturity, and then a stage is reached when no more elastic tissue is formed. Connective tissue may then at times replace it as a compensatory effort.

Relations of Acute Infectious Disease to Arterial Changes.—The changes occurring in the arteries during infections are undoubtedly of considerable importance as contributing factors in some of these arterial lesions. Eichhorst has observed changes in the intima of the arteries of the leg of a four year old child which required amputation because of gangrene developing during scarlet fever. In this case the adventitia and media were not changed, but there was a distinct separation of the intima. Wiesel has noted changes in the media and internal elastic membrane of arteries removed from patients dying of typhoid fever. These changes were an atrophy of the muscle fibers and a swelling of the intermuscular connective tissue. The muscle bundles no longer had a normal arrangement and were separated by granular debris. The elastic tissue was granular and finally was replaced by granules and detritus. Complete restitution may occur. Arteries removed from patients dying of scarlet fever, measles, septicopyemia and pneumonia were also examined. The same changes were found.

In acute infections the most marked changes are in the media. In diphtheria, typhoid fever, pneumonia and sepsis the muscular part of the media is affected most. In diphtheria and to a lesser degree in typhoid fever, pneumonia and influenza, the elastic fibers undergo granular degeneration, transverse breaking and tearing. In extreme cases homogeneous masses, in which broken-up elastic fibers and chains of granules may be seen, are found in the media.

In another group of infections, scarlet fever and sepsis, the elastic tissue changes are not so pronounced. The changes consist of a loss of nuclei with death of the muscle fibers, and an increase of the intermuscular connective tissue with the appearance of a homogeneous ground

Fig. 2
Vessels in case of arteriosclerotic gangrene after injection, showing occlusion of vessels and marked change from normal.

substance. Mesarteritis, not an endarteritis, is the characteristic change in acute infections.

There are three possibilities as to the outcome after these changes have occurred: (1) Complete repair may occur. Within forty days the repair may be complete; (2) a scar may form, which may be found years afterward. This may cause no functional disturbances; (3) a definite arteriosclerosis may develop, the pathological changes in the media extending into the intima. The arteries then become rigid, lose their distensibility and resilience and to some extent their contractility. In some cases they become irregularly dilated and deformed; in other cases their lumen is encroached upon intermittently or extensively by the thickening of their walls.

Relation of Old Age to Arteriosclerosis. — Old age alone cannot be regarded as an etiological factor, for arteriosclerosis does not increase steadily with age. The relation of hypertension to arteriosclerosis has never been satisfactorily settled, for cases of marked hypertension without arteriosclerosis and marked arteriosclerosis without hypertension are seen.

Experimentally an increased blood pressure and the effects of various poisons and of unbalanced diets have all been tested out in the production of arteriosclerosis.

Arteriosclerotic Gangrene. — Whatever the cause, arteriosclerotic gangrene is seen most frequently in old people. The late results of the changes occurring in early infections may be a more important causative factor than is usually thought.

Pott's Description of Arteriosclerotic Gangrene. — The clinical picture of arteriosclerotic gangrene is so definite that it is recognized without any difficulty. The description given by Pott (this type of gangrene is frequently referred to as Pott's sore toe) is so striking that I shall quote his original description. In Pott's "Surgery," Vol. 2, published in 1819, is a chapter entitled "Observations on the Mortification of the Toes and Feet." In this chapter he states:

"The powers and virtues of Peruvian bark are known to almost every practitioner of physic and surgery. Among the many cases in which its merit is

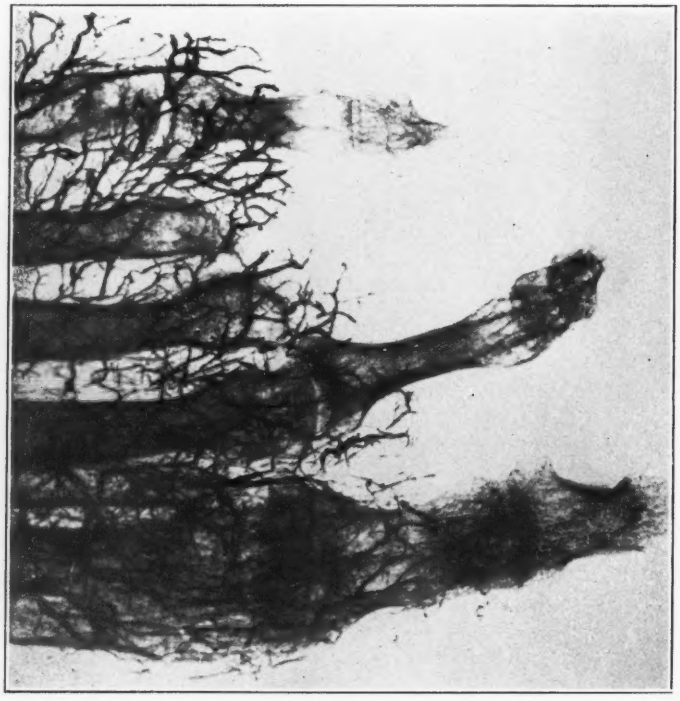

Fig 3
Injected specimen after amputation for gangrene in thrombo-angiitis obliterans. The injection mass does not pass beyond the arterioles. A recent thrombus was found in popliteal artery when amputation was performed.

particularly and justly celebrated are the distempers called gangrene and mortification; its general power of stopping the one, and resisting the other, has made no inconsiderable addition to the success of the chirurgic art; but still there is a particular species even of these in which this noble medicine most frequently fails. I mean that particular kind which, beginning at the extremity of one or more of the small toes, does, in more or less time, pass on to the foot or ankle, and sometimes to a part of the leg, and in spite of all the aid of physic or surgery, most commonly destroys the patient.

"It is very unlike to the mortification from inflammation, to that from external cold, from ligature or bandage, or to that which proceeds from any known cause, and this as well in its attack as in its progress. In some few instances it makes its appearance with little or no pain; but in much the majority of cases the patient feels great uneasiness through the whole foot and joint of the ankle, particularly in the night, even before there is any other than a small discolored spot on the end of one of the little toes.

"It generally makes its first appearance on the inside or at the extremity of one of the smaller toes by a small black or bluish spot; from this spot the cuticle is always found to be detached and the skin under it of a dark red color.

"If the patient has very lately cut his nails, or corn, it is most frequently, though very unjustly, set to the account of such operation.

"Its progress in different subjects, and under different circumstances, is different; in some it is slow, and long in passing from toe to toe, and from thence to the foot and ankle; in others its progress is rapid and horridly painful. It generally begins on the inside of each small toe before it is visible either on its under or upper part; and when it makes its attack on the foot, the upper part of it shows first the distempered state by tumefaction, change in color and sometimes by vesication, but wherever it is, one of the first marks of it is a separation or detachment of the skin."

This description covers the early clinical signs of arteriosclerotic gangrene as we see it. The relation of an injury, such as paring of a nail or a corn, must, however, be emphasized. Infection occurring in such an abrasion undoubtedly has something to do with the development or extension of gangrene, for infection followed by thrombus formation may then lead to occlusion of the lumen of the vessel and gangrene.

The relation between diabetes and gangrene is still a matter of discussion. Whether a mild diabetes, a glycosuria rather than a true diabetes, is due to arteriosclerosis involving pancreatic vessels, or the glycosuria determines the development of gangrene in arteriosclerotic cases is still a matter of dispute.

Perforating Ulcer of Foot in Diabetes.—There occurs in diabetes a peculiar perforating ulcer of the foot which resembles in many ways the perforating ulcer occurring in tabes. Some of the cases observed by Naunyn were not typical perforating ulcers. They did not have the typical location, the calloused borders or punched-out appearance of the ulcers associated with nervous lesions.

Many of these ulcers are described as beginning as a vesicle with a cloudy serum, from which developed a gangrenous inflammation

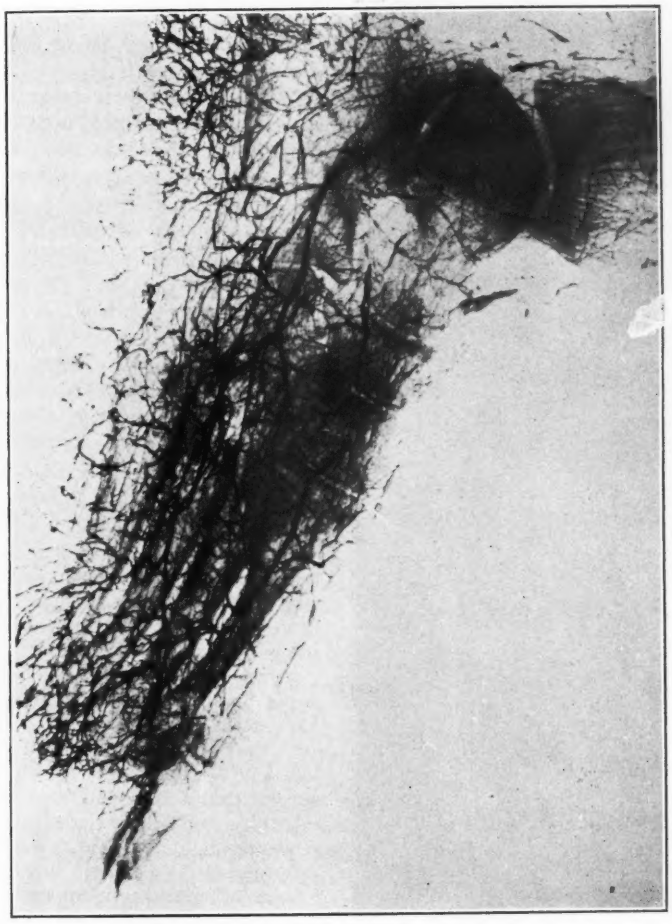

Fig. 4
Another view of specimen illustrated in Fig. 3, showing appearance of arterial pattern and collateral circulation in thrombo-angiitis obliterans.

which remained relatively superficial and extended but little. These are usually found upon the foot, but have been observed upon the upper extremity about the fingers and the palm. In many instances the destructive lesion has not extended to the bone and has healed when the diet was modified and dressings applied. In some cases the original ulcer has healed and then an ulcer has developed on the other foot.

Many reported as perforating ulcers cannot be accepted as such, for they are not crater-like, do not have calloused margins, and are not surrounded by anesthetic skin. They are, strictly speaking, ulcers which have followed a circumscribed phlegmonous inflammation of the skin and have refused to heal because the diabetes has not been controlled.

There does, however, occur in diabetes a typical perforating ulcer not associated with tabes. This ulcer is usually located upon the sole of the foot, just back of the head of the fourth metatarsal bone, has calloused margins, is deep and crater-like. Frequently it is not surrounded by anesthetic skin. In general appearance this ulcer resembles that occurring in tabes or upon the heel after division of the sciatic nerve. It may develop rapidly or relatively slow. Diseased capillaries have been found in the skin adjacent to the ulcer. It is quite probable that this type of ulcer is due to the same factors as the perforating ulcer in tabes. It develops at points exposed to pressure. Nerve lesions are also common in diabetes, although the skin surrounding such an ulcer is not always anesthetic. In not a few instances the destructive process extends to the head of the metatarsal bone, usually the fourth. This may become sequestrated without any marked inflammatory reaction.

Relation Between Diabetes and Gangrene.—Since attention was first called to the relation between diabetes and gangrene by Marshall di Calvi during the middle of the Nineteenth Century, there has been much discussion of it. That hyperglycemia with its associated metabolic changes is not alone the cause of gangrene, as originally claimed, can be demonstrated, for the severest forms of diabetes running a rapid course and terminating fatally, as well as the more chronic cases with a marked hyperglycemia, may have no gangrene. It may be possible that one

Fig. 5
Cross section of artery in thrombo-angiitis obliterans showing canalized thrombus occupying the lumen of the artery.

errs as much in the opposite direction, if one regards the diabetes observed in many of these cases merely as a part of senile arteriosclerosis affecting the pancreatic vessels, and denies any relationship between the two.

Changes in the arteries are common in diabetics. Grube found vascular changes in sixty-six out of one hundred and seventy-seven diabetics; von Noorden in two hundred and sixty-one out of six hundred and fifty (40 per cent); Croner found vascular changes in 32.41 per cent. Gangrene occurring in the diabetic occurs at an earlier age than senile gangrene. The average age at which diabetic gangrene is observed is 54.4 years, while the average age at which senile gangrene occurs is 66.2 years.

Gangrene occurring in diabetics undoubtedly has different causes, but the majority of the cases of gangrene is observed in patients with vascular changes. The percentage of cases in which vascular changes are observed vary from 65 to 100, and the changes observed in the vessels in these cases do not differ from those already described.

The question naturally arises as to where the occlusion leading to gangrene occurs. Heidenhain has stated that in the non-inflammatory type of diabetic gangrene occlusion occurs in the popliteal artery. This generalization does not seem to be justified, for cases of gangrene occur in which occlusion is not found at this level. There are certain clinical findings, however, such as the rather constant location of the gangrene which suggest that a large artery of the extremity must be occluded at a relatively definite point. Rapid extension of the gangrene may follow an inflammatory lesion caused by the trimming of a corn, the removal of an ingrowing toe nail, the scratching of an eczematous patch. Even in these cases there is usually an arteriosclerosis.

THROMBO-ANGIITIS OBLITERANS: PRESENILE GANGRENE

Considerable confusion exists concerning some of the arterial changes in this type of gangrene. Thrombo-angiitis obliterans is a clinical and pathological entity. The arterial changes consist of a thrombotic occlusion of the arteries, or of the arteries and veins. Thrombus formation follows inflammation of the arterial wall. Canalization of the clot permits of enough circulation to supply the needs of the tissue of the extremity.

Injected specimens of legs amputated for the various types of gangrene indicate a distinct difference between the arteriosclerotic and the thrombo-angiitic. In the arteriosclerotic type but little, if any, collateral circulation is established. It is a chronic process unaccompanied by any marked collateral circulation. In thrombo-angiitis, on the other hand, there is a distinct collateral circulation. In the injected specimens only the arterioles show (*Fig. 3*).

Meleney and Miller in 1924 injected the vessels of the legs of Chinese which had been amputated because of a vascular lesion in every way similar to thrombo-angiitis observed in this country. They found in these injected specimens extensive collateral circulation. Reichert had noticed these changes two years before. He did not, however, publish his findings. A roentgenogram of the injected vessels indicates the loss of the normal arrangement of the blood vessels and in the main vessels patchy defects suggesting almost complete obliteration of the lumen at some points. In stereoscopic plates numerous small arterioles may be seen which extend even to the line of gangrene. The vessels are best visualized by injecting Hill's mass.

Meleney and Miller recognized the importance of this collateral circulation. They said that if the disease continues instead of subsiding or coming to a standstill a contest develops between two forces, blockage of the vessels on one hand and collateral blood vessel development on the other. There is a limit to the speed with which collateral circulation can develop. At present one can only guess what it is that limits the speed of the disease process, but the outcome is determined by the relative speed of the two. After an equilibrium has been established following the first attack, if a second attack comes on or a dormant process becomes active again, the contest is renewed, the margin of safety is narrower, the potential capacity of a collateral circulation is less and gangrene is more likely to develop. It seems quite probable that the site of the thrombus may determine the clinical course of thrombo-angiitis. A thrombus originating in the femoral artery and descending is less apt to cause gangrene than a thrombus occurring in the posterior or anterior tibial arteries and ascending to the popliteal artery. When gangrene occurs in thrombo-angiitis obliterans not infrequently a recent thrombus is found in the popliteal artery. When the thrombus descends from the femoral artery, there is a greater chance for the collateral circulation to develop. The collateral circulation which develops in thrombo-angiitis obliterans may become an important factor in the treatment of this disease.

Charcot's Description of Intermittent Claudication as Observed in Horses.—Intermittent limping is one of the striking symptoms of this disease. It is interesting to read Charcot's description which is based upon veterinary medicine. It is as follows:

"An animal, which seems to be in good health and has rendered good service, is seized suddenly while working or racing. Most frequently both hind quarters are affected. After resting some hours, the symptoms disappear and the horse can again resume his work. At the beginning no peculiarities in the gait are noted, but soon the animal presents all the signs of greatest anxiety; violent, general trembling is noted; the eyes are fixed and haggard, and the facial expression is indicative of great suffering. The body is covered by profuse sweat. The respirations are quickened and noisy.

"Finally the animal falls to the ground, rolls about and seems to be suffering with colic. During this time the affected extremities are fixed and contracted, either in flexion or forced extension. The pulse is scarcely perceptible, the temperature is lowered and sensation is reduced. After twenty or thirty minutes, sometimes more, sometimes less, the symptoms become less marked; the animal appears quieter; the respirations become slowed; the heart becomes more nearly normal; the suffering is not so marked; motion is recovered; temperature and sensation become normal and the animal seems to have recovered."

Charcot, in an article from which the above description is taken, described intermittent claudication in a man 54 years old. At the autopsy an aneurysm of the right common iliac artery was found. The cavity of the aneurysm was partly obliterated (obliteration ligamenteuse); a fistula had been established between the aneurysm and the intestinal tract. Repeated gastro-intestinal hemorrhages had occurred. Death followed such a hemorrhage.

Charcot stated that intermittent claudication occurs in man as a result of the obliteration of the main arteries of an extremity, but that there are peculiar anatomical conditions which produce it. It is a problem of physiological pathology which will be solved only by assembling and analyzing the numerous clinical and experimental studies of different observers.

Thrombo-angiitis is a clinical and pathological entity characterized by thrombotic occlusion of the arteries alone, or of arteries and veins causing subjective manifestations. Among these, pain and intermittent limping; a cyanotic redness when the limb is in the dependent position; marked blanching when it is elevated, and pulseless vessels are the most prominent. Trophic disturbances of moderate degree, or of grave

consequence, often terminating in gangrene of one or both extremities, occur in the clinical picture. There are many variations in the clinical picture, which, as has already been intimated, may depend upon the site at which the thrombus forms and whether it descends or ascends.

The cause of the pain in thrombo-angiitis has been variously interpreted. Occlusion of the nutrient arteries in the large nerves has been found in some instances. In every case in which the arteries supplying the nerves have been occluded pain, enough to keep the patient awake, has been noted. Paralysis and anesthesia have not been present, however, and no degeneration of the nerves was found. Buerger gives as a possible explanation of the pain a general fibrosis about the entire nerve vessel cord.

Certain features of this pain, especially that observed in the early cases of thrombo-angiitis obliterans, suggest arterial spasm. Pain coming on after walking and disappearing after rest is certainly suggestive of arterial spasm and may be quite comparable to that associated with angina pectoris. Ligation may have an effect on such pain and has in some of the cases in which the femoral artery has been ligated.

RAYNAUD'S DISEASE

In studying the different types of lesions of the vessels and their consequences, it is well to study the original descriptions. Failure to do this has accounted for some of the confusion which exists concerning the different clinical syndromes.

Raynaud's description of the disease named after him is as follows:

"The commencement takes place in different ways. In one case the extremities become pale, exsanguine, and then take on a lilac color; at the same time tinglings or shooting pains occur. These are bearable at first and accompanied by the sensation of numbness, but soon are replaced by a burning heat which cold water calms for a time, but this improvement is only momentary; after changes of color, which are impossible to describe, the ends of the fingers take on a violet color, which becomes more and more pronounced, and in which the nails participate; on touch, these parts are found to be icy cold. In another case it is the livid redness which appears first. The patients believe ordinarily that they have chilblains, the more so that they are subject to them; but at the end of a few days the itching to which they paid no attention becomes pain, of which the severity goes on exasperating and no longer permits of any doubt.

"From this epoch the livid marblings show themselves in the neighborhood of the affected parts along the digits, over the course of the collateral arteries and rise to a great height over the corresponding limbs. Arrived at this point, the lesion becomes more pronounced, according to the different modes.

"Sometime the digits become entirely black and insensible, small phlyctenulae appear upon one digit (particularly the little finger), then on another, always at the extremity. This phlyctenula develops, fills with seropurulent liquid, breaks and leaves the derma naked.

"The small excoriation which results from it persists some days. To see this lividity, this glacial cold, one would believe that the gangrene was about to extend more and more; but the malady recedes, the parts become reanimated, the small ulcer recedes, cicatrizes and contracts, and there results a kind of conical tubercle immediately subjacent to the nail. This recovery is only temporary. Soon we see the same series of phenomena recommence either on the same digit or another, and I have seen this state of thing renew itself during two years with intervals of remission. At an advanced epoch on the pulp of all the digits, a great number of small, white, depressed, very hard cicatrices are seen, which are, so to speak, the stigmata left after the malady, and which prove that it is not arrested by the epidermis, but that the most superficial layers of the true skin have been attacked. At a given moment all the nails may fall simultaneously. This progress of the malady is not incompatible with the formation of veritable sloughs, especially on the little finger. But that which strikes one most is the slender form which the ends of the digits take, the hardness of their tissue and their shrivelled appearance.

"It may happen that this parchment-like appearance may supervene without having been preceded by the formation of blisters. The skin takes on a drab color, it seems thinned, dried up, shrivelled, and there results from it a conical form to the finger. One could compare it to nothing better than the state of things which would have ensued if one had violently squeezed the finger in a chain band and it had retained the form impressed upon it thereby."

The prognosis in this disease differs from that of other types of gangrene, and I shall quote again from Raynaud's early description of the disease:

"A dry gangrene is always a grave condition, and Fabrice de Hilden, during a practice of forty years, declared that he had never seen a single case of cure. Suppose a doctor is called to a young woman of 25 to 30 years old and sees her unfold the picture of which I have attempted to give an idea.

"In the presence of these atrocious and persistent pains, of this deep black coloration, invading at the same time the hands up to the base of each digit, the feet up to the tarsus, the nose up to the root, I ask, what well informed doctor who, seeing, so to speak, his patient die at all extremities, would not give the most gloomy prognosis?

"Nevertheless the issue, as we have seen, is far from being constantly fatal. The error is very natural; it is because I have committed it myself, because I have seen it committed by eminent physicians that I wish to rectify it.

"The progress of the malady constitutes an element of prognostic importance. When ten to twelve days after an invasion of the severe pains one sees black, dry sloughs form symmetrically on the extremities, it may be hoped that the process of mortification will soon be arrested and that after a period of elimination,

the duration of which will not exceed four or five months, the cure will be complete. If, on the contrary, the tendency to gangrene is less clearly shown, if we observe only cooling, cyanosis, bullae returning from time to time with or without periodicity, we ought to fear that the malady may be prolonged a considerable time; and this form, although it may not immediately compromise life, is nevertheless the most grave, because it renders life miserable from intolerable suffering and opposes a permanent obstacle to the accomplishment of social duties."

I have quoted extensively from the original descriptions of the clinical pictures given by Pott, Charcot and Raynaud, because they were dealing with distinct clinical entities.

ANESTHESIA AND TREATMENT

The surgeon must be in possession of a few fundamental facts if he hopes to meet the surgical indications correctly in gangrene occurring in the diabetic. While he may be able to base his judgment upon clinical findings, there are certain laboratory findings upon which he will in the end have to base his conclusions.

In the normal fasting individual, the blood contains 0.1 per cent of sugar. This is not, however, a fixed percentage. A perfectly normal individual may have as much as 0.16 per cent, or even somewhat higher. When the blood sugar rises above the normal limit, sugar passes through the kidneys and appears in the urine. The point of concentration of blood sugar at which the first trace escapes through the renal epithelium and appears in the urine is known as the kidney threshold. The process of escape is referred to as the renal leak.

When a patient has a normal blood sugar and nevertheless has sugar in the urine he is classed as a case of renal diabetes. For some reason or other his renal epithelium is permeable to sugar. It is a question, however, whether it can be stated without reservation that such a patient is a better operative risk than one who is suffering with an essential diabetes. Those cases in which there is an abnormally high blood sugar with no sugar in the urine must have serious consideration. This group, unless recognized and carefully handled, contains patients in whom surgical disaster occurs wholly unexpectedly. They frequently give the history that they have had diabetes for which they have been successfully treated, or from which they have recovered. No sugar may appear in the urine and the patient seems to be a good operative risk, but an operation is followed by coma. Most of these cases have a mild nephritis, some an advanced one. It should be remembered that the blood sugar may be abnormally high and still no sugar may appear in the urine.

There is no need to discuss the advisability of determining the amount of sugar in all cases. Statistics concerning surgery in diabetics vary considerably. The earlier statistics were made before insulin was introduced.

It has been stated that a fatal result always follows major operations on patients whose blood sugar is over 0.35 per cent, or whose blood carbon dioxide combining power is less than 40.

Cooperation between the surgeon and internist is necessary in these cases. Inflammatory processes increase the normal blood sugar. They produce the same effect, but to a greater extent in diabetics. The blood sugar is increased beyond the normal limit after the ingestion of glucose and the blood sugar curve is prolonged beyond the normal two hours. The tendency to acidosis is more marked. A diabetic patient may have progressed in a most satisfactory manner for a considerable period of time and may have been able to utilize an appreciable amount of carbohydrate, but if an infection occurs sugar may appear in the urine, even though the patient has taken scarcely any food. It is in these cases that cooperation between the surgeon and internist is imperative, for frequently it has to be decided whether an operation should be performed even in the presence of a marked hyperglycemia, because it is impossible to control the diabetes in the presence of an infection, or whether it is better to institute treatment with the idea of improving the patient's condition.

The question of anesthesia has been frequently discussed in this class of cases. Ideas change from time to time and procedures differ in different clinics. Ether, Berkman states, is still the anesthetic of choice in the Mayo Clinic. Fitz believes that it has decidedly bad effects. Besides acting as an anesthetic, ether has an immediate and definite effect upon the body fats and liver. Ether, when administered to dogs, causes a marked concentration of blood fat, because there is an increased solubility of fatty substances of the tissues in the blood. There also occurs a temporary suspended excretion in the urine of nitrogen, glucose and acetone bodies.

Spinal anesthesia is the anesthetic of choice in both the arteriosclerotic and diabetic gangrenes. If a general anesthetic is considered, ethylene is the anesthetic of choice, but there are few, if any, contra-indications to spinal

anesthesia, which is ideal for amputations made necessary by gangrene occurring in these cases.

Several different procedures have been adopted in the treatment of thrombo-angiitis obliterans. Their multiplicity indicate the futility of many. Reference has already been made to the collateral circulation which must be an important factor in delaying gangrene in these cases. Ligation of the femoral artery just distal to the profunda has been suggested in these cases to force the development of a collateral circulation before an ascending thrombus could reach the popliteal artery. This operation would also throw out of function the main arteries of the extremity which is diseased. One case in which this operation was performed died thirty-six hours after ligation from a cerebral accident. Three other patients upon whom ligation of the femoral artery has been performed have been markedly improved.

In Raynaud's disease, the pure type of which I have observed but rarely, a peri-arterial sympathectomy should first be tried.

BIBLIOGRAPHY

Berkman, D. N.: A Pre-Operative and Post-Operative Study of Diabetic Patients with Surgical Complication. Minn. Med., 9:28, 1921.

Buerger, Leo: Is Thrombo-Angiitis Obliterans Related to Raynaud's Disease and Erythromelalgia? Amer. Jour. Med. Sci., 139:105, 1910.

Charcot: Sur la Claudication Intermittente. Compt, rend. Soc. de bilo., 5:225, 1858.

Croner, Wilhelm: Uber 100 poliklinisch beobachtete Falle von Diabetes mellitus; insbesondere ihre Beziehung zur Tuberkulose und Arteriosklerose. Deutsche med. Wchnschr., 29:821, 1903.

Francois, V. J.: Essai sur les gangrenes, Paris, 1832.

Grube, Karl: Zur Aetiologie des sogenannten Diabetes mellitus. Ztschr. f. klin. Med., 27:465, 1895.

Heidenhain, L.: Uber die Behandlung der senilen Gangran der unteren Extremitaten insbesondere bei Diabetikern. Deutsche med. Wchnschr., 17: 1111, 1891.

Hildebrandt, Stabsarzt: Uber diabetische Extremitatengangran. Deutsche Ztschr. f. Chir., 72:351, 1904.

MacCallum, W. G.: Arteriosclerosis. Physiol. Rev., 2:70, 1922.

Marchand: Uber Arteriosklerose. Verhandl. d. Kong. f. innere Med., 21:23, 1904.

Meleney, F. L.; and Miller, G. G.: A Contribution to the Study of Trombo-Angiitis Obliterans. Ann. Surg., 71:976, 1925.

Pott, Percivall: Observations on the Mortification of the Toes and Feet. Pott's Surgery, 2:298, 1819.

Raynaud, Maurice: On Local Asphyxia and Symmetrical Gangrene of the Extremities. Translated by Thomas Barlow. In Selected Monographs, 1-199, 1888.

Thoma, R.: Uber die Stromung des Blutes in der Gefafsbahn und die Spannung der Gefafswand. Beitr. z. path. Anat. u. z. allg. Path., 66:92, 259, 377, 1920.

Wiesel, Josef: Der heutige Stand der Lehre von der Arteriosklerose (Atherosklerose) und ihre medikamentose Behandlung. Wien. klin. Wchnschr., 22:401, 455, 1909.

GASTRO-INTESTINAL STUDY OF FOUR HUNDRED EPILEPTICS: PRELIMINARY REPORT*†

By W. R. BETHEA, M.D.,
Memphis, Tenn.

The writer desires to give due credit for assistance to Dr. T. B. Bass, for twenty-three years Superintendent of this institution, and to his local staff workers; to Dr. Grady W. Shytles, State Radiologist of Texas and Radiologist of this institution, and last, but not least, to the late Dr. Russell D. Carman, of the Mayo Clinic.

Dr. Carman had accepted an appointment on the staff of non-resident men scattered throughout the United States to participate in this study and had outlined part of the work. On account of illness, he was forced to resign.

Dr. Bass has been a close student of epilepsy for twenty-three years and has drawn many conclusions which will be of great value in summing up the results of combined study of the entire body of every patient. His conclusions will be of value in the prevention and treatment of epilepsy.

Dr. William P. Spratling, Superintendent of the Craig Colony for Epileptics, gives us this definition of the condition. Epilepsy is a disease or disorder affecting the brain and characterized by recurrent paroxysms which are abrupt in appearance, variable in duration, but generally short, and in which there is impairment or loss of consciousness, with impairment or loss of motor coordination, with or without convulsions.

It is not the writer's wish to review the literature in this article. Epilepsy is the most ancient of nervous disorders. For years it was recognized as *morbus caducus* (falling sickness). It has been studied clinically, physiologically, pathologically, biochemically, and recently, psychologically. Up-to-date very little radiological study has been done.

It has been a much discussed question whether epilepsy is an organic or a functional disease. Increasing knowledge has tended to diminish the number of true or idiopathic cases, that is, we are finding more cases of epilepsy based upon a recognizable pathological foundation. We are

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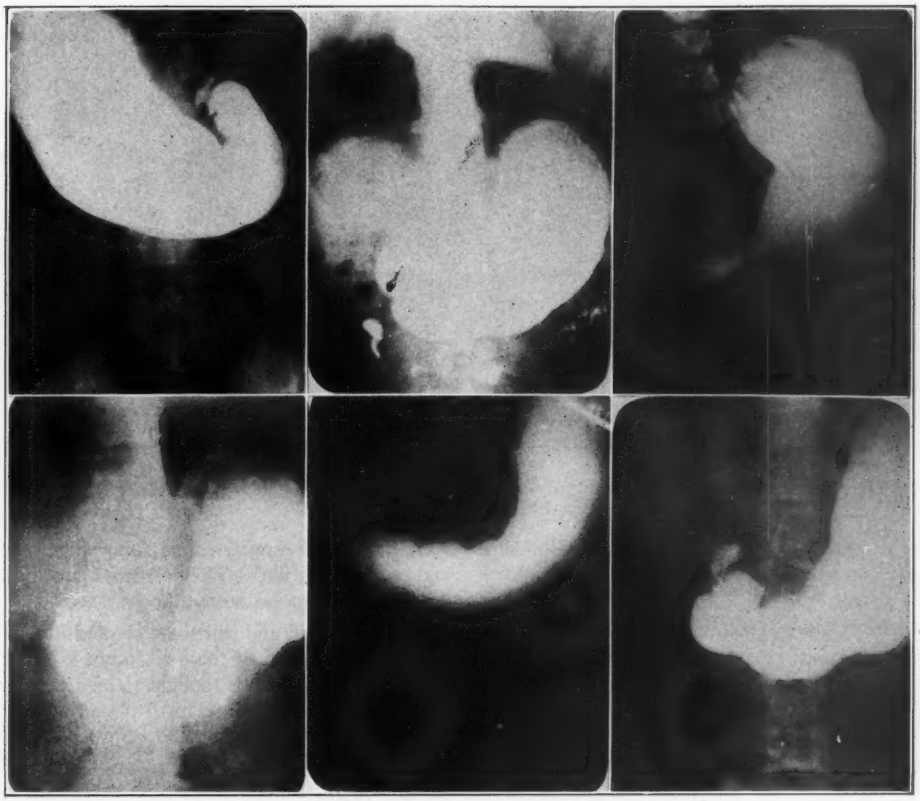
†From the Texas State Epileptic Colony of Abilene, Texas.



Upper left, Fig. 1. Large dilated stomach.
Upper center, Fig. 2. Large dilated stomach.
Upper right, Fig. 3. Marked spastic pylorus.
Lower left, Fig. 4(a). Marked spastic condition of the stomach resembling malignancy.
Lower center, Fig. 4(b). Same stomach as (a) eighteen months later.
Lower right, Fig. 5. Some spastic condition of the pylorus and of the longitudinal muscles of the stomach wall.

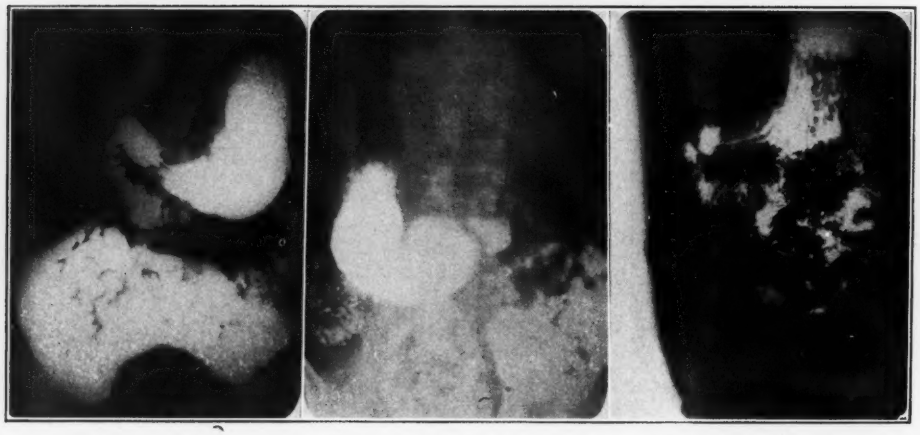
working upon the basis that epilepsy is a symptom of many disorders and not due to one primary cause. I firmly agree with Dr. E. B. Block that it is useless to look for any one cause of epilepsy.

Dr. A. W. Robertson states in an article on "Colon Stasis in Epileptics" that the leaking septic tank (the colon) and the later involvement of the small intestines and liver in chronic intestinal stasis are steps accompanying the failure in the alkaline reserve which has been described by Cuneo. He further states that the greater the involvement of the mucous membranes of the body generally, particularly the colon in the chronic catarrhal process, the greater the output of organic salts and the more profound the demineralization of the body tissues, and the more extensive the colonic catarrh, the more grave is the epilepsy in frequency and severity.

All ages are subject to the disease. Male and female are about equally susceptible. Occupation is not a predisposing cause, and numerous occupations were represented in the institution studied.

Three main factors should be considered in the causation of this malady: first, heredity; second, neuropathological lesions; and third, irritation.

Heredity evidently plays some part, if not a great part. Among the residents of the Texas



Left, Fig. 6. Five-hour retention with small intestines pushed up out of the pelvis suggesting pelvic abnormality.
Center, Fig. 7. Five-hour retention.
Right, Fig. 8. Spastic condition of the small intestines.

colony there were several members of the same family: parents, children, and in one instance twin sisters.

Neuropathology has been thought by some very able observers to be the exciting cause. The writer cannot thoroughly agree with this idea, since we see many brain tumors, brain and sub-dural hemorrhages, brain and skull injuries, in which no convulsive seizures are manifested, and it is not thought that neuropathology alone will cause epilepsy.

Third, irritation is the agent which I wish to discuss most freely in this report. Irritation may be mechanical or chemical. It may come from neuropathology, tumor, thickened areas of skull with pressure, local areas of meningitis, sinusitis, impacted teeth, abscessed teeth, infected tonsils, menstrual and ovarian disturbances, gall bladder diseases, diseases of the gastro-intestinal tract, auto-intoxication from toxic absorption from the gastro-intestinal tract, or other sources. Many causes have been found and removed in the treatment of inmates of this institution with great benefit to the patients, some of whom have gone for years without return of epileptic convulsions.

The main point in this report is the findings in the gastro-intestinal tract, which will be discussed collectively.

In the esophagus, thirty-three cases of cardiospasm were found. These were from a slight spasm to a retention of several minutes with dilatation of the esophagus.

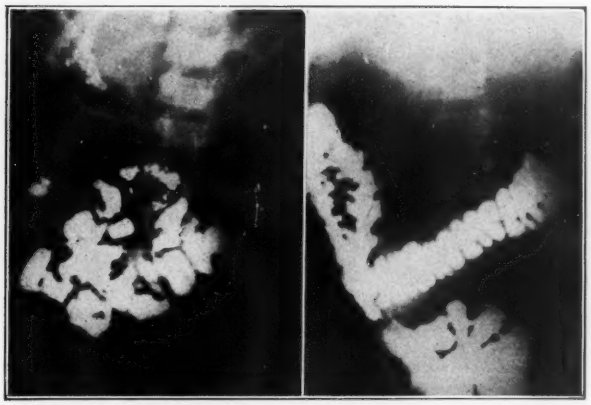
Stomachs were reported as follows: twenty-one were negative. They showed no filling defects and emptied in five hours.

Three hundred and thirty-six showed five hour retention, and many of these retention of twenty-four hours. Retention is thought to be due to several causes: atonic conditions, dilated stomachs and pyloric spasms.

There were one hundred pyloric spasms, or better, gastric spasms. Many cases showed filling defects that varied from an extreme leather bottle type of stomach to hour glass contractions, and some of them resembled a gourd, with the pyloric end representing the neck.

One case was given barium immediately after a convulsion; the stomach was found to be in a state of tonic contraction, and it was some minutes before it relaxed sufficiently to allow more than a couple of ounces of barium to enter the stomach. It might be said in this connection that observations on the gastro-intestinal tract during a convulsion with the abdomen open suggest that the muscle coats of the entire intestinal tract undergo the same spastic contractions as the remainder of the muscles of the body. This is also suggested from the passage of feces and urine during many convulsions.

There were one hundred and fourteen dilated stomachs. Many were very large and reached far down into the lower abdomen. Those showing greater dilatation also were atonic. Dilated stomachs in quite a few instances were thought



Left, Fig. 9. Spastic condition of the small intestines.
Right, Fig. 10. Undescended cecum and marked intestinal stasis.

to be due to the overeating that is so common among epileptics.

Seven cases showed evidence of very rapidly emptying stomachs. This condition is thought very probably due to pellagra complications, as there were a number of cases of pellagra among those rayed. Pellagra will also probably account for some of the results found in the remainder of the gastro-intestinal tract, such as spastic, hypermotile small intestines, and some of the cases of colitis.

There were two definite gastric ulcers and eight questionable ones. There were so many spastic stomachs and so many different types of spastic deformity that some cases simulated ulcer very closely. Some cases that were thought malignant and to contain gastric ulcers were rechecked by the fluoroscope and radiograph from ten months to one year later, when they showed perfectly negative stomachs. Some of these are among the illustrations.

Pressure deformities number six. These are due to large livers, large spleens, gall bladders and other organs. One case showed gallstones; one, gastric adhesions; and one, congenital deformity.

Only one case was reported malignant in which upon recheck the deformity in the stomach could be proven to be pathological and not spastic. This case had died during a convulsion before a recheck could be made. So it is questionable that there was a malignancy in the entire series studied. This series included patients from nine to about fifty-five years of age, most of them in the twenties and thirties.

STOMACH ILLUSTRATIONS

Many duodenal caps were not checked by fluoroscope to determine the condition of those not thoroughly filled.

Two hundred and seventy-eight caps were negative. By negative cap it is meant those that show no filling defects.

There were fourteen pressure deformities. Most of these showed filling defects suggesting pressure from the gall bladder.

Twenty-three spastic deformities were practically all accompanied by spastic pyloric deformities.

Forty-seven were not filled. In the number not filled, the condition of the stomach did not suggest pathology of the cap sufficiently to recheck the cases.

Six duodenal ulcers were sufficiently positive from the typical deformities to make a diagnosis of ulcer.

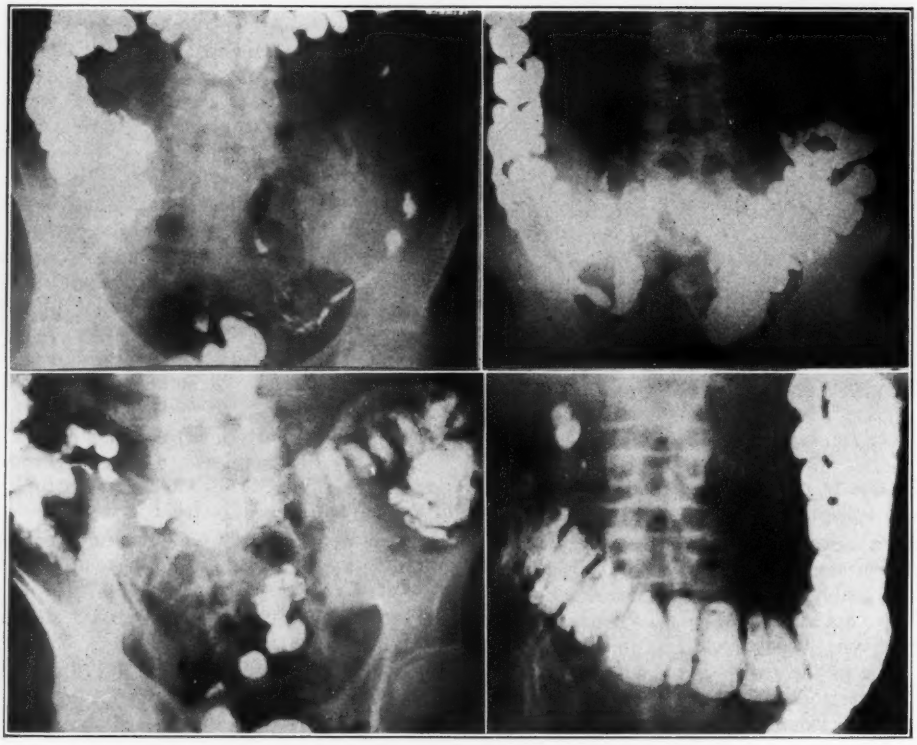
There were three questionable ulcer deformities; four oblong caps due to bands about the second portion of the duodenum, or Harris bands; and one diverticulum.

SMALL INTESTINES

Here again we are confronted with some very unusual gastro-intestinal findings. It has been claimed that drugs, especially sedatives such as bromides, are responsible for a considerable amount of the spastic and cerrated appearance of the small intestines that is seen in epileptics. I do not agree with this theory. Among our cases were numerous children who had taken very little bromide; and some of my private cases in children with only a mild degree of epileptic convulsions, to whom no bromides have been administered, show these characteristic findings in the small intestines. The findings were very apparent. In two cases plates were presented for study that did not show these intestinal findings, and upon investigation they were found to be ward attendants in the institution and not patients.

It is possible that the spasms are due to intramural causes as Jirasek suggests: that is, they are due to degenerative lesions in the cells of Auerbach's plexus, and since the pathology is thus located the administration of antispasmodics or even nerve resection is futile.

Fifty-two cases were negative.



Upper left, Fig. 11. Spastic condition of descending colon and sigmoid.
Upper right, Fig. 12. Ptosis of the colon and ninety-six hour retention.
Lower left, Fig. 13. Ninety-six hour retention.
Lower right, Fig. 14. Ninety-six hour retention with gallstones showing.

One hundred and sixty-two were hypermotile. By hypermotile is meant that the small intestines carried the barium column very rapidly without much deformity of the intestinal wall. The column reached the cecum, and in many instances the small intestines were almost empty in five hours.

One hundred and sixty-eight cases were spastic. The spastic changes can hardly be described accurately, as they have from a saw tooth deformity to a ribbon-like appearance, as if they had been squeezed with a clothes presser.

There was one inguinal hernia.

There were nineteen constrictions of the terminal ileum. These ranged from a slight delay in emptying with a partial constriction at the ileocecal valve to pin-like constrictions and typical Lane's kinks.

APPENDICES

Twenty-three appendices were negative. By negative it is meant that the appendix was visualized, there was no dilatation of the lumen, and no evidence of fecaliths.

Two hundred and fifty-four were not outlined. This large number was probably due to the fact that plate findings only, not the fluoroscope, were used in many of these cases; also to the fact that many cases had already had appendectomies.

There were one hundred and seven chronic appendices. In these, the appendix was filled in sections, some showing fecaliths, others showing constrictions and some retaining barium for ninety-six hours.

COLON

The colon was negative in fifty-six cases. These showed a fairly good outline of the entire

colon, with forty-eight hour emptying time and about normal haustra.

There were seventy-eight cases of chronic colitis. These could not be exactly differentiated, because some were hypermotile and others were very spastic, probably due to pellagra complications.

Stasis was observed in one hundred and sixty-five cases. Colon stasis and constipation were commonly found in this study. Stasis extended in many instances over a period of ninety-six hours, with almost the entire colon filled; and it is thought that many more cases would have shown stasis had it not been for the fact that the patients took purgatives very freely.

The patients observe that epileptic attacks come on more often during constipation than when the bowels are kept moving at regular intervals. Stasis is one of the conditions that seems to produce intestinal toxemia, which, to the writer's mind, is one of the most frequent aggravated causes and irritations that precipitate epileptic convulsions.

Sixty-five spastic colons were observed. Here again pellagra was thought to play a part in complicating the intestinal findings, as spastic colons are found frequently in pellagra sufferers. Low grade chronic colitis may also have caused some of the spastic changes.

Twenty-eight colons were hypermotile. Pellagra and laxatives also are thought to be responsible for most of these.

Ptosis was observed in sixteen cases. This number is not thought to be accurate, as colon cases are practically all taken in the prone position. I am sure, with the large number of cases, the number of ptoses would have been much greater had the patients been studied in the upright position.

There were three megacolons.

There were fifteen congenital membranes or adhesions. Most of these were manifest by deformities about the cecum with fixation.

There were five undescended cecums. These ranged all the way from the cecum up under the liver down to the moderate degree inversion of the cecum just above the crest of the ileum.

Three diverticula were observed, mostly on the descending colon and sigmoid.

Transposition of the colon, one case.

The remainder of the bowels seemed to be in normal position with the cecum and appendix on the left side, and transverse and descending colon about in normal position, except on the right side.

There were probably two foreign bodies in the large bowel. The number was surprisingly small, considering that many of the cases were mentally sub-standard and some of them bordered on insanity.

CONCLUSION

Whatever the causes of epilepsy may be, they are evidently multiple, and great relief can be obtained in the treatment if a general body study is made of every case and all the pathological conditions that can be found, and all sources of irritation are removed. No definite conclusions will be attempted until the final study has been completed by the entire Board and a general tabulation of findings has been compiled.

STOMACH

Cardiospasm	33
Negative	21
Five hour retention	336
Pyloric spasm	100
Gastric ulcer	2
Gastric ulcer (questionable)	8
Dilated	114
Rapidly emptying	7
Pressure deformity	6
Gallstones showing	1
Adhesions	1
Congenital deformity	1
Malignant	1

COLON

Negative	56
Chronic colitis	78
Stasis	165
Spastic	65
Hypermotile	28
Congenital membranes or adhesions	15
Undescended cecum	5
Ptosis	16
Diverticula	3
Megacolon	3
Transposition	1
Probable foreign body in colon	2

DUODENAL CAP

Negative	278
Pressure deformity	14
Spastic deformity	23
Not filled	47
Duodenal ulcer	6
Duodenal ulcer (questionable)	3
Oblong cap (Harris band)	4
Diverticula	1

SMALL INTESTINES

Negative	52
Hypermotile	162
Spastic	168
Inguinal hernia	1
Constriction of terminal ileum	19

APPENDIX

Negative	23
Not outlined	254
Chronic	107

REFERENCES

Spratling, William P.: Craig Colony for Epileptics, Church Hill & Peaterson Text M. & N.
Block, E. B.: Tice System of Medicine, 10:401-461.
Robertson, A. W.: Colon Stasis. Brit. Med. Jour., 2:1191-1193, Dec. 27, 1924.
Jirasek: Intramural Causes of Spasm of Digestive Tract. Acta Chir. Scandinav., 59:91-99, 1925.

DISCUSSION (Abstract)

Dr. Grady Shytles, Abilene, Tex.—One of the most striking examples of gastro-intestinal conditions' affecting epileptics is the case of Opal McGahey, whose plates are presented. This patient had most violent seizures at frequent intervals, but when the x-ray showed a condition in the abdomen of marked enteroptosis, she was put to bed, with the foot of the bed elevated, and while she remained in this position not a single seizure occurred. This proves conclusively, I think, that her epileptic seizures were at least precipitated, if not caused entirely, by the gastro-intestinal condition. The gastro-intestinal tract, with its associated pathological conditions, is a very definite causative factor in producing epileptic convulsions.

Another striking example of what a local pathological condition may do in producing convulsions is that of a bright young girl who had four unerupted teeth. After the removal of these teeth, her condition was so much improved that her friends and family hardly knew her for the same girl.

We at present cannot explain why it is that in the large number of cases who have had abdominal section, we have found, almost without exception, practically no omentum. Cases of acute appendicitis in these adults, therefore, assumed the virulent manifestations which appendicitis shows in early childhood, and if they are not operated upon very early they, like children, often develop a general peritonitis, because there is no omentum to wrap up this acutely inflamed organ.

Dr. Bethea (closing).—I should like to call attention to the first x-ray picture presented, the case of spasms of the small intestines. These findings have run consistently through our cases. This radiograph was taken at about five hours, and the marked choppy spastic condition is the one referred to as constant in epileptic sufferers. When the case of chronic appendix was presented with a practically normal small intestine, the contrast was so great that one immediately thought that the appendix case had no epileptic symptoms. The first case was in a child nine years of age who had only mild epilepsy and had had little, if any, sedatives.

LID SARCOMA: SPECIMEN OF OPTIC NERVE FIBROMA*

By DUNBAR ROY, M.D.,
Atlanta, Ga.

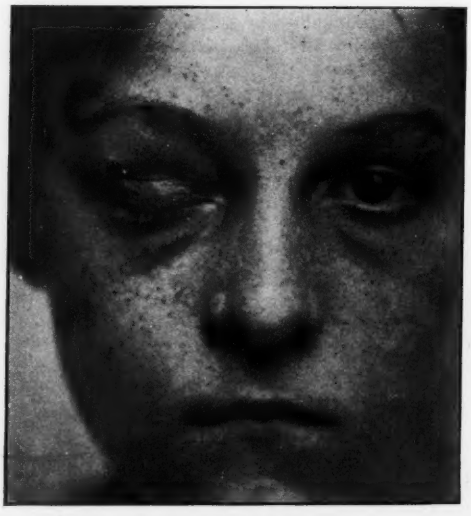
The sarcomatosis that occurs about the eye is usually a feature of early youth, whereas the epitheliomas are of adult life. An epithelioma of the eyeball and adnexa is not uncommon. Sarcomas occur in vascular parts as in the orbital cavity and in the nose. Sarcoma of the nose is not at all infrequent in this part of the country. I have seen seven cases, though, in the North they are rare. A physician from Boston last night said to me that he had never seen a case.

The question of cancer is serious to all of us. With all our research and laboratory work we are not curing malignant growths. Cancer is apparently on the increase. It may be that Dr. Howard, of Toronto University, by means of liver extract, may accomplish something, or that colloidal gold will be of use.

Sarcoma of the lid is a rare condition. Fuchs and Von Hippel have told us that it is exceedingly rare, but sarcoma is not infrequent in the orbital cavity, and those parts that are very vascular. The sarcomatous condition of the lid usually develops from something that seems very simple.

In 1916, a white girl, aged eight, presented herself at the clinic with what seemed to be an ordinary chalazion on the upper lid. My assistant opened it and curetted the area. There was an unusual amount of blood, so he took some scrapings and submitted them for examination. The pathologist said he was not sure it was sarcoma, but he was very suspicious of it. Two weeks later I returned to the city and saw the patient and at that time the growth had returned and increased until it was two-thirds underneath the lid. It seemed to be freely movable under the lid and on entering the lid I could see granulation, indicating that the mass had perforated through all the tissues, through the cartilage and through the conjunctiva. I sent the girl to the hospital and made a complete excision of the growth, removing the cartilage and conjunctiva, until I could pull the wound apart and look right on the eyeball. Microscopic examination at that time showed spindle cell sarcoma.

We then used radium and x-ray treatment. The child had no pain, no irritation of any kind about the eye, and the vision was good. She was treated for three or four months, when the growth returned, and extended a little to each side. I submitted her to a



*Clinic, Clinic Session, Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

second operation, removing the growth as well as possible. In the cavity I put radium and allowed it to remain for twenty-four hours.

The healing seemed to be good, and we again treated her with radium for six months. At the end of the year there seemed to be some return of the growth, but we continued the radium treatment. Six months later it seemed that the growth was getting in behind the eyeball, for there was a drooping of the lid and some proptosis. I tried to save the eye, because vision was perfect, but I finally did another operation, put the radium in the cavity and allowed it to remain for four hours. We used radium treatment regularly and also x-ray, but in spite of it the sarcoma increased in size.

In February, 1917, the patient had some pain about the eyeball, which protruded a little more, and I was certain that the growth was down in the orbital cavity. I then made an incision around the entire orbital cavity, removing the lid and eyeball, and doing a perfect exenteration of the orbital cavity so far as I could, scraping down to the bone. Following this zinc solution was applied in the cavity and the radium and x-ray therapy were continued.

A short time later we found an exuberance of the growth and pain became so intense that the patient had to have anodynes. The case went from bad to worse and in November of that year the child died, with a great mass sticking out of the orbital cavity, and a general sarcomatosis of the skin.

This shows how an apparently simple little thing can produce a widespread malignant condition.

I have never seen a case of sarcoma of the nasal cavity which has been cured, and those that are reported as cured must have been wrongly diagnosed, or of a very mild type.

Case 2.—This colored girl came to Georgia from Florida. In 1920 she received a very severe blow on the eye. Two weeks later there was slight protrusion and a little downward tendency of the eyeball. Photographs showed that her appearance was perfectly normal so far as the eye was concerned before this accident. When I saw her, there was a distinct proptosis, with pushing down of the eyeball. There was no pain, no congestion, no inflammation about the eyeball, but there was no vision in the eye and examination showed complete white atrophy of the nerve, indicating that whatever the growth was it had so embarrassed the nerve as to cut off all its blood supply and nutrition.

Not knowing just what the character of the growth was, I decided that we should get rid of the whole orbital cavity. I removed the eye and then found that the optic nerve was entirely surrounded by the growth. The optic nerve ran through the growth. I made a large incision and took out the optic nerve with the tumor. You can see in the specimen that the nerve is entirely surrounded and runs through the growth itself.

The tumor was found to be a neurofibroma. I followed the case for three years, and the patient is doing very well. So far as I know, there has been no return of the growth. This case is interesting because of the character of the growth and the manner in which it invaded the optic nerve.

RICKETS AND SUBSEQUENT DWARFISM ASSOCIATED WITH RENAL DISEASE: REPORT OF A CASE*

By D. C. WHARTON SMITH, M.D.,
Baltimore, Md.
and
MARY D. WALSH, M.D.,
New York, N. Y.

There have been references from time to time in the literature to changes in the skeleton associated with renal disease. As early as 1883, Clement Lucas published a paper entitled "A Form of Late Rickets Associated with Albuminuria." In the English literature Barber, Fletcher, Paterson and others described several cases with a clinical picture identical with the case we are reporting, in which they found at autopsy chronic interstitial nephritis. The symptoms of all their cases were strikingly similar. The onset was insidious, and the development was not markedly retarded until the sixth or seventh year. As the children became older, the retardation of growth was more and more marked and was associated with bony deformities. Genu valgum, the most characteristic and frequent condition, was usually observed around puberty. Polydipsia and polyuria were usually present. The specific gravity of the urine varied between 1.004 and 1.008. Albumin was found in all cases, and at times a few hyalin casts. The radiographic studies of the skeleton revealed

*Read in Section on Pediatrics, Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

multiple fractures and general osteoporosis. The diagnosis in a number of the cases was made at autopsy, death having been caused by uremia following orthopedic operations.

The patient we are reporting had been referred to an orthopedic surgeon because of "stiffness when walking, and underdevelopment." Owing to the presence of sugar in the urine and other unusual urinary findings, the orthopedist referred the patient to us.

R. N., aged 14 years and 2 months, was admitted to the Union Memorial Hospital, Baltimore, in October, 1924.

The family history was unimportant. There was no history of kidney trouble or underdevelopment among his relatives.

The past history was interesting. First pregnancy. Delivery was terminated by low forceps. His birth weight was seven and one-half pounds. He was breast fed for 14 months, the diet being supplemented at the age of 1 year with cereals, broth, bread and vegetables. Early development was normal. Dentition began at 6 months and he was said to have begun to walk at 9 months. After infancy, however, he was considered a delicate child, although he had no serious illnesses. Adenoidectomy was performed at the age of 3 years. He had varicella at 5 years, measles at 6 years; pertussis, followed by bronchitis and pneumonia, at the age of 10 years. During his convalescence from pneumonia his urine showed signs of "dropsy". There were apparently no symptomatic manifestations of renal disease at this time. However, after his illness he "never seemed well, had no endurance and was always pale". He lived in the country and led an out-of-door life. He slept well, had had good digestion and a normal appetite up to the preceding three or four years. Since that time he had developed a terrific thirst and a voracious appetite. He had voided large quantities of urine, two to three quarts daily. On two or three occasions sugar was found. He was considered intelligent, did well in school and attended the eighth grade of a public school in Pennsylvania.

Present Illness.—The onset of his chief complaint, that of stiffness when walking, began in the fall of 1920 at the age of 10 years, or 4 years before he came under observation. The stiffness had begun very gradually in the lower extremities and become steadily worse, so that at the time of examination he was able to get around only with the greatest difficulty. There had been, also, considerable muscular weakness, but no pain or discomfort.

Physical Examination.—October, 1924, showed a temperature of 99.2° (rectal); pulse 92; respirations 22; weight 42½ lbs.; height 47 inches; blood pressure 110/84. The patient at the age of 14 years, as compared with the normal, was 14 inches below the average height, and 55 lbs. below the average weight. At first glance he appeared not to be more than six years of age. Mentally he was alert. The skin and mucous membranes were pale and the abdominal veins very prominent. While he had no apparent discomfort, he was very unsteady on his feet, obviously weak, and waddled along, swinging his legs from his hips with his feet rotated outward. Genu valgum was present to a marked degree. There was poor muscular development with considerable atrophy of the lower extremities. The distance between the lower level of the thorax and the anterior superior spines of the ilia was obviously shortened. The motion of the spine was greatly limited. The tonsils were large and badly infected. The heart was slightly enlarged and on auscultation the usual signs of mitral insufficiency were present. There were no pubic hairs and the genitalia were underdeveloped. The remainder of the physical examination has little bearing on the discussion of the case.

X-Ray.—Radiographically, four subperiosteal fractures were found in the ulnae and tibiae. There was marked osteoporosis of practically all the bones. The vertebrae appeared fused together, explaining the short distance between the costal margins and the crests of the ilia. The epiphyseal lines were very irregular. There was a coxa vara of the right hip. The roentgenologist's diagnosis was "late rickets and osteomalacia".

Laboratory.—The laboratory examinations were of great interest. The blood showed a secondary anemia with a hemoglobin of 52 per cent. The blood Wassermann and the intradermal tuberculin tests with 0.1 and 0.2 and 0.5 mg. were all negative. The non-protein nitrogen was 44.4 mg. (normal 24-35 mg.); the uric acid 5.7 mg. (normal 1-3 mg.), and the creatinin 3.5 mg. (normal 0.4-0.5 mg.) per 100 c.c. blood. The inorganic calcium was 5.0 mg. (normal 10-11 mg.) and the inorganic phosphorus was 5.6 mg. (normal) per 100

Renal dwarf, age 14 years, 2 months, compared with the average 14-year-old boy. Genu valgum very pronounced.

c.c. blood. The sugar tolerance test demonstrated a normal curve.

The volume of urine was from 2,000 to 3,000 c.c. in 24 hours. The specific gravity was fixed (Mosenthal test) and varied between 1.005 and 1.008. A large amount of albumin was constantly present, but never any sugar, acetone, diacetic acid, blood or casts. The phenolsulphonephthalein excretion was less than 10 per cent in two hours.

As the patient presents a picture identical in every respect with the series of cases reported in the English journals, there can be little doubt that we are dealing with a renal dwarf. The laboratory findings demonstrate some pathological condition of the kidneys. Since at autopsy the English cases showed a chronic interstitial nephritis, in all probability the patient's symptoms are caused by the same condition.

There are many interesting questions that arise as to the cause of renal diseases. It is obvious in certain of the cases at least (those in which symptoms were noticed soon after birth) that the renal condition must have begun *in utero*, or shortly after birth. In most of the reported cases there was no previous disease to which the kidney damage could have been attributed. In our case, the chronic nephritis may have been caused by the diseased tonsils.

The most interesting problem is the changes in the bones. Why are the symptoms so uniform, and why is genu valgum such a constant symptom? There must be some very slow metabolic disturbance that brings about the resultant picture. Certainly, a type of rickets develops and failure of growth occurs. Moreover, when the weakness of the bones reaches a certain point, infraction or dissolution of the continuity of the bone takes place, especially in the lower extremities, on account of their bearing the weight of the body. It is doubtless for this reason that genu valgum and the other deformities develop. Apparently growth at the epiphyses is not taking place rapidly enough for enlargement of the epiphyses to occur. The deformities, therefore, are not in the nature of enlargements, but rather in the nature of bendings.

Miles and Feng, who studied osteomalacia in women in China whose diets were deficient principally in the fat soluble vitamins, described a series of ten cases in which the deformities were quite similar to those of our patient. Their cases showed distinct alterations in the bones, crumbling of the pelvis, and fractures. They found that the calcium of the serum was greatly reduced; 5.8 to 7.5 mg. (normal 10-11 mg.) per 100 c.c.

In this case of renal dwarfism, however, there was no known dietary error, leading one to believe that some unknown metabolic interference with the calcium balance was caused by the poor function of the kidneys.

While it is impossible to draw any conclusions from the clinical picture and laboratory findings of a single case, it seemed worth while to describe this patient rather fully as references to this condition are very meager in the American literature.

The blood chemistry and radiographic studies would seem to place it in a metabolic group between rickets in young children on one hand, and osteomalacia in adults on the other. It can not be called true rickets as there is no increase in the cartilage. It can hardly be called osteomalacia, though it resembles it in many respects, as that is a much more acute disease. For lack of a better name, the condition might well be called renal rickets.*

Note.—The patient died in March, 1926, at the age of 15 years and 5 months. Death was caused by uremia following an acute respiratory infection of three days' duration.

REFERENCE

1. Clement, Lucas: Lancet, June, 1883.
2. Davies, Colley N.: Trans. Path. Soc., 35:285, 1884.
3. Guthrie, Leonard: Lancet, 1:585, 728, 1893.
4. Lyon, Glover: Lancet, 1:102, 1901.
5. Sawyer: Birhm. Med. Review, pp. 511, 549, 1903.
6. Hirsch: Jour. Med. Sci., Phila., 125:1056, 1904.
7. Idem: St. Thomas's Hosp. Reports, n.s., 35:459, 1906.
8. Miller: Proc. Roy. Soc. Med., (Sect. Child.),4:38, 1911.
9. Fletcher, H. Morley: Proc. Roy. Soc. Med., (Sect. Child.), 4:95, 1911.
10. Sutherland: Proc. Roy. Soc. Med., (Sect. Child.), 5:3, 1912.
11. Parsons: Brit. Med. Jour., 2:481, 1911.
12. Weber: Brit. Jour. Dis. Child., 9:211, 1912.
13. Miller-Parsons: Brit. Jour. Dis. Child., 9:289, 1912.
14. Naish: Brit. Jour. Dis. Child., 9:337, 1912.
15. Hutinel, V.: Gaz. des hop. de Par., 85:27, 1912; Brit. Jour. Dis. Child., 9:507, 1912.
16. Barber: Brit. Med. Jour., 2:1204, 1913.
17. Idem: Lancet, 1:142, 1918.
18. Idem: Lancet, 1:18, 1920.
19. Paterson, D. H.: Proc. Roy. Soc. Med. (Sect. Child.), 13:107, 1920.
20. Shipley, Park, McCollum and Simmonds: Amer. Jour. Dis. Child., Feb. 1922.
21. Green: Amer. Jour. Dis. Child., July 1922.
22. Miles and Feng: Jour. Exper, Med., Jan. 1925.

DISCUSSION (Abstract)

Dr. J. H. Mason Knox, Jr., Baltimore, Md.—I had the opportunity of seeing this case with Dr. Smith, and I think you will all agree with me that the patient presents a very remarkable picture and one perhaps which will not prove to be as unusual in the future as we think it is at the present time. Essentially it is a child showing definite physical retardation, very marked changes of a rachitic nature in the skeleton, with a lowered calcium output due almost certainly to a de-

*Shipley, Park, McCollum and Simmonds in 1922 suggested the possibility of the existence of a true renal rickets.

creased functional activity of the kidney. This case is in reality one of those which, as has been suggested by Park and Shipley, could be called endogenous rickets of renal origin. The gradual onset of the rickets was not because of any deficiency in food, fresh air or sunlight but rather due to a pathological alteration in the organism itself, in this case to renal insufficiency.

There may be diminution in normal stature, dwarfism, without rickets. I recall the case of a girl I had under observation about 15 years ago. She was a child twelve years old who presented a picture of dwarfism with infantilism. As she grew older, none of the sexual characteristics of adolescence appeared. She always retained, during the six years that I saw her, the stature and appearance of a girl about eight years of age. This child was mentally bright, although she had some peculiar manifestations in school. She was good in most subjects but poor, as I recall it, in arithmetic. She was quite talented in music. Her mother was a musician. She had marked polydipsia and polyuria. The urine had a very low specific gravity; always a trace of albumin; never any sugar. She voided usually 3 to 4 litres of urine in twenty-four hours. She had a high sugar tolerance. She had a very small skeleton, delicate bones and no gross evidence of rickets, although at that time the x-ray was not generally used as an aid in diagnosis of rickets.

Of course, we suspected a cystic kidney, but its presence was not definitely determined. She led a normal life for six years, excepting for one rather severe attack of uremia, from which she recovered. She died in the second attack of uremia. These cases suggest that skeletal changes and alterations in development may be associated with renal insufficiency. It is not unlikely that when we are more alert to recognize them, such cases will prove to be less infrequent than is now supposed.

Dr. Wilburt C. Davison, Baltimore, Md.—Dr. Smith's paper brings out three points: first, the child has interstitial nephritis; second, he was a dwarf; third, he had rickets. Interstitial nephritis in children is very rare. From an examination of the records of the cases of nephritis in the Harriet Lane Home, is seems probable that if a child has ever had hematuria, with or without edema, glomerular nephritis can be demonstrated at autopsy; if edema without hematuria is present, tubular nephritis can be diagnosed, while if hematuria and edema are both persistently absent interstitial nephritis will be found. Dr. Smith's patient did not have hematuria or edema.

There must be something to connect renal dwarfism with rickets. Dr. Paul J. Shipley has suggested a possible explanation in his experiments on rats. He found that slices of bone from a rachitic rat would become calcified if placed in a salt mixture like that of normal serum except for a low sodium chloride content, but that if a small amount of sodium chloride or other salts was added to the salt mixture calcification would not occur. It would have been interesting to determine the amount of sodium chloride in this patient's serum, for it is possible that as a result of the interstitial nephritis there may have been an increase in the inorganic salts of the blood. Calcification, after all, is an ionization phenomenon and if the ionization of calcium is repressed by an increase in the concentration of other salts, calcification is interfered with.

I think Dr. Smith's title of renal rickets is a very good one. In one of Barber's cases the patient was twelve and a half years old when first examined and was apparently perfectly normal. Within three years he developed nephritis of the interstitial type and at that time had very definite rachitic changes in the bones. We may find other cases, and I think Dr. Smith is to be congratulated for calling our attention to this condition.

Dr. McKim Marriott, St. Louis, Mo.—Dr. Smith has drawn attention to a condition which I believe is fairly common, but very infrequently recognized. Boyd, of Iowa City, has recently reported a number of cases giving radiological evidences of rickets, which was due to nephritis or other conditions disturbing the mineral metabolism. We have in the St. Louis Children's Hospital at the present time a boy with interstitial nephritis, with a high blood phosphorus and low blood calcium. His bones show the typical radiologic changes seen in rickets. There is also dwarfism. In the treatment of such cases, cod liver oil and radiation are rarely effective, as in the ordinary types of rickets. Very little can be done to change the inorganic constitution of the blood, so that treatment must chiefly be directed towards preventing the further development of nephritis. This can best be accomplished by removal of those foci of infection which are the etiological factors in most cases of nephritis occurring during childhood.

Dr. Smith (closing).—I agree with Dr. Knox that rickets must be caused by other renal insufficiencies. Green reported a child of two or three years of age with polycystic kidneys that died with very marked rickets.

Dr. Davison's discussion about the sodium and the chloride in the serum was very interesting. Some time ago investigators were mostly interested in the calcium. In the future when more of these cases have been studied we may be able to draw more definite conclusions.

I should like to ask Dr. Marriott if the cases he speaks of were definite dwarfs. I have seen several rachitic children with evidence of renal changes, but I believe the true renal dwarf as shown here and described mostly in the British journals, is a rare condition.

From the standpoint of treatment, unfortunately, we have little to offer. We must try to find a possible focus of infection early enough to prevent the nephritis. Also, the history of these cases teaches us the importance of careful urinalysis before we consider an orthopedic operation on any rachitic child.

INTUSSUSCEPTION*

By E. C. Davis, M.D.,
Atlanta, Ga.

The antiquity of our knowledge of intestinal obstruction goes back to the days of Hippocrates. In modern times the frequent ruthless invasion of the abdomen in all types of disease by inadequately trained surgeons has increased the number of cases. I shall speak of intestinal obstruction only in the child and infant.

The two chief causes of obstruction in infants and children are congenital pyloric stenosis, oc-

*Clinic, Clinic Session, Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1927.

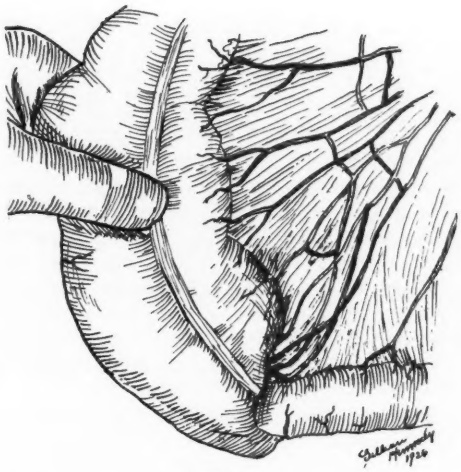


Fig. 1
Ileocecal intussusception before reduction.

curring within the first few days or weeks of the life of the child, and intussusception, which occurs later in life. Rarely is this observed after the seventh year, though it may occur within a few weeks after the birth of the child. The infrequency of this trouble in the South is noticeable. Whether we are not recognizing these cases, or whether they do not occur, is of interest in contrast with the reports that come from Great Britain and the Continent. To those of us who are associated with clinics, intussusception has not been of frequent occurrence. I now observe that an increasing number of these cases is being brought to the attention of the medical profession in my community. It is said that in Scandinavia, where they use very little calomel, castor oil, or other purgatives, intussception is very rare. In this Country on the first complaint of intestinal trouble a dose of calomel or castor oil is given. I do not wish to censure this too severely, but the use of purgatives is known to be excessive, and in the newborn child it is apt to bring about very serious results.

Between 6 and 8 per cent of cases of intussusception occur in the adult, and the remainder usually occur in children before the seventh year. After the fourteenth year it is extremely rare. Probably intussusception is due to a congenital condition, the thickness of the lymphoid tissue in the small intestine and the large gut. This tissue becomes irritated and develops a tendency toward obstruction, or a resistance to the peristaltic wave, and with the resistance there is a tendency to force this portion of the intestine down into the lower portion of the gut, simulating what has been called by some the swallowing of the upper portion by the lower. There is often, also, a congenital narrowing of the colonic orifice which produces an inclination toward the development of intussusception. We find, too, that inflammation of Meckel's diverticulum is one of the commoner causes, and this may occur in the child as well as the adult. The improper use of purgatives exerts an irritating influence on the tissue and undoubtedly has something to do with the development of this form of obstruction.

The condition is easily recognized, but recognition depends largely upon what the mother of the patient tells us. Intussusception occurs in the rosy cheeked child as well as in the child with lowered vitality. In the rosy cheeked child we are apt to overlook this and mistake it for appendicitis, ileocolitis, stasis, or some other pathology of the intestinal tract. If we pay more attention to the mother's story, it will be of great assistance in diagnosis, especially if she tells us that the trouble began with acute pain in the abdomen, with evidence of shock, pallor and a tendency to scream. She may say that this lasted for a few minutes and then subsided,

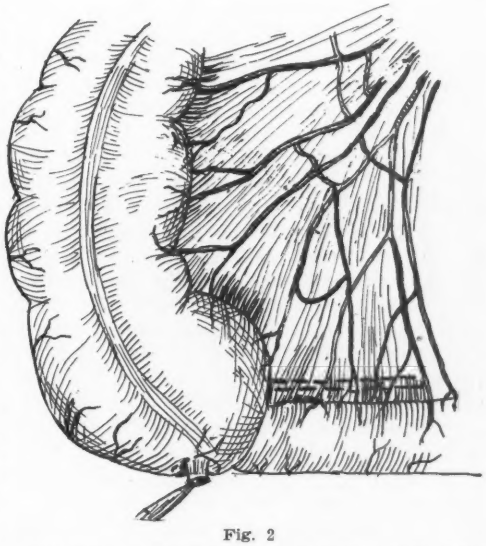


Fig. 2
Introduction of three layers of chromic catgut under the peritoneum to act as a splint to prevent recurrence. (This suggestion was first made by Dr. A. N. McGregor, of Glasgow, "Glasgow Medical Journal," 1903, lx, 263, Abdominal Operations, Moynihan.)

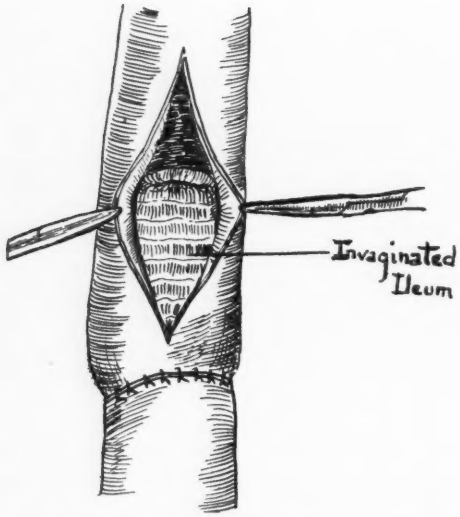


Fig. 3

Jessett-Barker Method for advanced intussusception. The intussuscipiens incised, exposing the intussusceptum. (From Bickham's Operative Surgery.)

but was followed by a mucous and bloody evacuation and later by a more definitely bloody evacuation. If we examine the child early we find a tumor in the ileocecal area and we know at once that we are dealing with a case of intussusception. In the commonest type, the ileocecal, the ileum becomes invaginated into the colon. The ileocolic and the combined types may occur. Between 60 and 70 per cent are ileocecal, and if the mass is found in the right iliac region the diagnosis is usually easy. If there is any doubt, and the condition has persisted for some time, a rectal examination should always be made. If the intussusception be ileocecal or ileocolic the mass can be palpated through the rectal wall with the hand on the abdomen. In most cases, an anesthetic is necessary during such an examination to control the patient. The only two conditions that are likely to be confusing are ileocolitis and appendicitis. Ileocolitis would be more likely to occur in a child who showed evidence of the presence of an inflammatory condition.

We have acute intussusception and chronic. Some of the cases progress so that the vascularity is not destroyed but is interfered with, and the children continue with this semi-obstruction.

There is only one treatment worth considering in intussusception. Reduction of the intussusception is no longer considered feasible unless it is to be followed by an operative procedure. Even when the tumor mass has been largely reduced, a condition is still present which may later result in the death of the child. Operation is indicated even in those cases in which the reduction seems to be complete. Moynihan, the great English surgeon, states that after the reduction is made, before he operates he throws into the intestine a large amount of oil. He then opens the abdomen and undertakes the relief of the obstruction.

I wish to show a few slides which were made by Miss Lillian F. Kennedy, of Atlanta, for my associate, Dr. M. T. Harrison, to convey an idea of the procedures and methods of accomplishing this relief (presenting slides).

In the treatment of this trouble a few definite facts should be kept in mind. In the first place, in the reduction of intussusception we do not make traction. The retraction should occur from the distal area upward, a disengagement of the enveloped intestine from below upward. We should grasp the colon and feel the tumor, and with the fingers gently press this mass down through the ileocecal opening. We should avoid the possibility of pulling on this portion of the intestine. If the cases are seen within the first

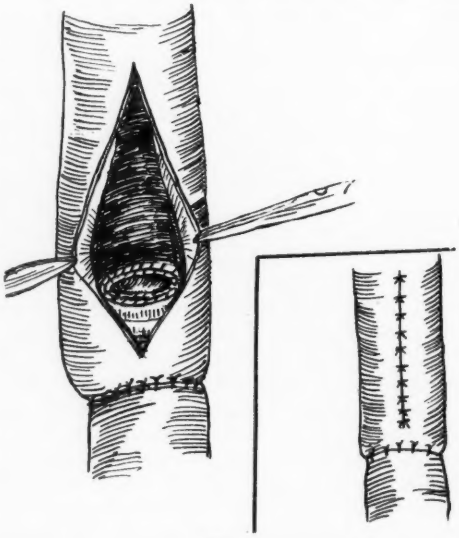


Fig. 4

Suturing together the two concentric walls of the intussusceptum, following excision of the invaginated portion.

Suturing the intussusceptum to the intussuscipiens, along their lateral surfaces of contact, and closing the temporary window in the intussuscipiens. (From Bickham's Operative Surgery.)

eight hours, as they should be, reduction is usually very easy. With the index and little fingers, or with the two index fingers, we can gently press the mass down. After we find the appendix we know it is normally outside, and we have the intussusception reduced. All the cases I have had under my observation have thus far been under the diagnostic skill of my friend, Dr. Charles Mashburn, of Atlanta, who has recognized them early. The patients have come to me in such excellent condition that the recoveries have been very satisfactory. In all cases there has been a plication of the mesentery and quite a chain of lymphatic nodes extending up in the folds of the mesentery. I have made it a practice, where it was at all justified, to remove these lymphatics by incising the mesentery, peeling them out, and sewing the raw area over with catgut. Thinking that there may be some relationship between this trouble and the appendix, I have removed the appendix when practicable. Three rows of chromic catgut stitches introduced into the mesentery just above the ileum for about two inches, if one is very careful not to involve the blood supply, will act as a temporary splint until intestinal tonicity is re-established. I thought that this was an original procedure, but found that McGregor, of Glasgow, used it previously. If the mesentery is properly sutured, it forms a support long enough for nature to prevent a recurrence.

It has been found that there is nearly always an unusually mobile colon, and we may fasten the colon to the ileocecal fossa by a few posterior stitches.

A very ingenious operation has been done by two English surgeons, Bartlett and Jassett, for advanced cases. They fasten the edges of the intussuscepted gut with a few stitches, and then cut out the invaginated gut with a cautery and sew the raw end over to protect it from bleeding. After that has been done, they close this area and leave the anastomosis accomplished by nature, and made permanent. In resection of the gut, I tried this once and lost the patient.

The cases in which an artificial anus has been made have not been satisfactory. I have not undertaken it.

I wish to emphasize the following: early diagnosis and prompt operation are necessary. When this is done, the results will be generally satisfactory. Many of these cases have been operated upon three or four times before complete recovery. The operation devised by McGregor, which I thought was my own until I perused the literature, will obviate many recurrences and save lives. The first eight hours are vital to these little patients, and decide often the success or failure of the operative measure. Babies soon pass beyond any hope of relief, as their resistance is slight. We cannot emphasize too strongly the importance of an early diagnosis and prompt and efficient surgery.

BUCCAL SPIROCHETOSIS*

By E. W. CARPENTER, M.D.,
Greenville, S. C.

For many years we have been interested in the etiology, pathology and treatment of ulceromembranous lesions of the mouth, throat and nose. As young men, we saw numerous cases of noma, cancrum oris, Ludwig's angina and an occasional case of unusual ulceration which sometimes involved the tonsil, sometimes the fauces, cheeks and gums. Again we saw numerous cases of false membranes, which did not behave like the classic diphtherias, but were nevertheless subjected to the heroic treatment of diphtheria of thirty-five years ago. When these cases recovered we congratulated ourselves on our knowledge of materia medica, and when they died we consoled ourselves with the conclusions that diphtheria was frequently fatal any way. With the dissemination of a knowledge of bacteriology in the South nearly forty years ago, paths began to be cleared through forests of ignorance, these paths became roads and today we believe we are on the paved highway leading to the solution of some of the baffling questions.

Investigators have at one time or another held each of the bacterial denizens of the mouth to be the cause of one or more of the above mentioned conditions and their claims have as often been proved to be false.

Beginning soon after the mobilization for the World War, ulcerous lesions in the mouth taking on a variety of types and grades of severity were greatly increased. The laboratory report in nearly all of these cases was to the effect that Vincent's organisms were present in large numbers, together with varying numbers of staphylococci, streptococci and pneumococci.

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*Read in Section on Eye, Ear, Nose and Throat, Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

Such reports have stimulated us in an effort to interpret the significance of the presence of the spirillum and rod-shaped organisms in their relations to each other and to the pathology in these numerous lesions of the mouth. To this end we submitted fifty tonsils for bacteriological examination, taking them in the order of their removal and not selecting the cases for operation or study.

LABORATORY REPORT OF MR. MURRAY

The following observations were made. Fontana stain shows up very delicate spirochetes that would escape unnoticed with gentian violet. Children apparently have Vincent's spirochete infection much less often than adults. The spirochetes show up more often in liquid pus than in solid.

Percentage of tonsils showing Vincent's spirochetes and fusiform bacillus	50%
Percentage of tonsils showing no Vincent's spirochetes but fusiform bacillus	13
Percentage of tonsils showing no Vincent's spirochetes or fusiform bacillus	37
	100%

Smears taken three weeks after the operation showed the following results:

Fairly numerous spirochetes and fusiform bacilli	13%
Very few spirochetes and fusiform bacilli	31
Negative for spirochetes or fusiform bacilli	56
	100%

In the post-operative report are a few children who had perfect teeth and gums and yet showed spirochetes and fusiform bacilli. This fact strengthens our belief that the teeth and gums are hiding places for these organisms and that even in a mouth appearing perfectly normal there are some recesses where the organisms manage to eke out an existence. We then submitted a number of mouths which had neither teeth nor tonsils to the laboratory for study and have never found more than an occasional spirillum present in these smears. This suggests the conclusion that if we would rid modern society of this pest, we must pull all the teeth and remove all the adenoids and tonsils. It is in an effort to forestall the wholesale slaughter of teeth that we have interested ourselves in this study.

During the last year whenever a case of "thrash" or gingivitis appeared in an infant's mouth, we have made it a rule, no matter how trivial the lesion, to have it cultured, and in nearly every instance the study has revealed that the predominant organisms were a rod and spirillum.

American literature contains generous contributions on this subject, but we have made very little progress in the study of the etiology of these lesions except to conclude that noma, *cancrum oris*, trench mouth, Ludwig's angina, gingivitis and most ulcero-necrotic lesions of the mouth have a common etiology: that is, they are due to spirilla and fusiform bacilli.

The dental profession has made no notable contribution to the solution of the etiology of gingivitis. There is a tendency to blame local conditions such as tartar and "uric acid" in the system, "over-acid mouths" and poorly balanced rations. We believe that these conditions are only contributing causes and that the spirochetes are the primary factor.

The spirochete found in the mouth is responsible for far more disease than has been suspected. A conversation with Dr. David Smith, of Johns Hopkins, and a study of some beautiful slides which he has made in his investigation of lung spirochetosis suggests that probably a large variety of spirochetes live in symbiosis with each other or with some other organisms whose presence is responsible for the destructive qualities of the spirochetes.

In looking up the literature we found a vast number of symptoms and diseases in which spirochetes were the predominating organism. The bronchoscope was responsible for the first direct recovery of an uncontaminated specimen of spirochete from the depths of the lung. Then followed some very momentous and surprising discoveries at Ray Brook Sanatorium in unclassical consumptives. These cases had frequent hemoptysis and showed the clinical signs of tuberculosis without bacilli in the sputum. Many of them were proven to be cases of lung spirochetosis.

T. H. Halstead makes the following observation:

"This fusiform bacillus, producing a pseudo-membranous ulceration of the throat and mouth, is not limited in its field of activity, however, to these parts. While it is the infective organism in Vincent's angina and in noma, it has also been found as the specific cause of reported cases of laryngitis, bronchitis, bronchopneumonia and mastoiditis. It causes hospital gangrene and has been found to be the etiological factor in phagedenic ulcers of the penis and genitalia, in abscesses of the lung and spleen; and in a case recently reported by Tunnicliff the fusiform bacillus was the pathogenic agent throughout in a case of general pyemia, with multiple abscesses in various parts and organs of the body following appendicitis. It is quite apparent, therefore, that Vincent's angina is merely the local manifestation in the upper respiratory tract of the pathogenic activity of a specific organism which is frequently active in all parts of the body."

Scurvy and mercurial stomatitis have also been added to the list of affections caused by the spirochete group. Hemorrhage in various degrees of severity constitutes a most prominent symptom of spirochetosis. Many patients complain of early morning expectoration of blood or of staining the pillow slip with bloody mucous and in numbers of these cases the lesions are discovered as granuloma on the dental side of the gums which bleed freely upon gentle trauma.

Recently we saw a white man twenty years of age with a typical picture of Ludwig's angina. Both tonsils were covered with soft slough. The fauces, bottom of the tongue, and floor of the mouth were so swollen that he could not breathe or drink through his mouth. Edema extended superficially under the skin of the neck almost to the clavicle. After pushing his tongue aside laterally smears were taken from both tonsils, and they showed myriads of rods and various sized and shaped spirochetes. Very few other organisms were in evidence. This was a picture we had seen a few times previously, which always ended in death. The case under the treatment we shall mention recovered rapidly.

We have notes on a great number of cases of ulcero-necrotic and ulcero-membranous lesions of the mouth and fauces, severe cases of gingivitis, pyorrhea and scurvy, for which we have used the same treatment with great success.

Until recent months we used a mixture of carbolic acid, Fowler's solution, ipecac and tincture of myrrh with very gratifying results. We next tried neo-arsphenamine intravenously and locally. This remedy is not without some danger intravenously and is difficult to use locally, particularly with children.

"The Vincent-Plaut bacillus,[1] as is well known, has been found in the nose, the intestines, the liver, the ear, uterus and around the foreskin of the penis, apparently without active symptoms. It may, therefore, be assumed, as many writers suggested, that the Vincent-Plaut bacillus in itself may create no actual pathologic process, but becomes active only when the proper medium is created through the influence of the bacteria."

In searching for more light on the etiology and pathology of so-called Vincent's infection, we discovered a paper by Kritchewski and P. Seguin.[2] We shall quote freely from this article, first, because it is in French and may not have been readily accessible to many students in this country, and secondly, because it answers satisfactorily many questions in connection with buccal spirochetosis.

"Necrotic and ulcerous affections of the mouth are local spirochetosis complicated by various secondary infections.

"Only the experimental reproduction of necrotic lesions obtained through animal inoculation in the laboratory with pure cultures of buccal spirochetes can furnish definite proof of the spiral nature of the ulcerous affections of the mouth.

"We have carried out two series of experiments on the guinea pig.

"First of all, we inoculate the animals with various secretions, coming either from acute affections (Vincent's angina, ulcero-membranous stomatitis), or chronic affections (marginal gingivitis, alveolar pyorrhea). We were thus able to ascertain that most of the time these secretions, regardless of their origin, were pathogenic for the guinea pig.

"Then through injecting animals with various combinations of cultures we sought the relative importance of germs present in production of the lesions. In this manner we established the predominance of spirochetes in connection with other constituents of the buccal flora. The pathogenic action of spirochetes is moreover notably reinforced by the presence of the fusiform bacillus.

"A guinea pig of from 300 to 400 grams was injected subcutaneously with four to five drops of pus coming from a pyorrhea sack and diluted in 1 c.c. of physiological salt solution.

"On the next day we observed a little puffiness and edema at the place of inoculation. Toward the third day an abscess the size of a hazel nut appeared beneath the skin. The clearly circumscribed lesion gradually reached the size of a large nut about the tenth day. The violet red tumor had a hard coat, and no fluctuation could be felt. Unless spontaneous evacuation takes place, the abscess persists for from four to five weeks. It diminishes gradually and complete reabsorption is regularly observed.

"Puncture of the abscess never shows pus before the third or fifth day. The yellowish gray pus is thick, fetid and rich in very much altered leucocytes.

"Spirochetes do not appear in the lesion, but after the third day they increase in number as the lesion grows and are especially abundant between the tenth and fifteenth day. After a month's time, it is customary for them to diminish and disappear by degrees.

"By examining secretions by dark field illumination, one usually ascertains that the spirochetes belong to different forms.

"We have several times identified in one sample of pus the three forms which we have already briefly described, *Spirocheta tenuis, Spirocheta dentium, and Spirocheta acuta.*

"Beside these spirochetes, we constantly find a nonmobile fusiform bacillus, cocci (streptococci, staphyloccus parvalus), and often also a little vibrio.

"The histology of the lesions is most instructive. By cutting off the abscesses between the tenth and fifteenth day, upon examining sections, we ascertain that the wall is made up of several distinct layers.

"There is a wide band of necrosis, 'anhiste' and slightly colored (zone B); there follows the most inward purulent zone (zone A). On the outside of the former may be seen a strand of infiltration (zone C), bound by a thick fibrous ring (zone D) separating the abscess from the normal tissue.

"In the portions stained by the valuable technique of Manouelian, it may be seen that the entire necrotic zone is 'stuffed' with spirochetes without other related bacteria. A felting of fusiform bacilli separates the spirochetes from the pus sac. These are rare in the zone of infiltration, and never invade the fibrous shell of the abscess.

"It is necessary to emphasize that on the whole our statements are in accordance with those of histopathologists who have studied analogous lesions (Vezpremi, Leblaye, Tunnicliff, etc.).

"There is different modality of lesions according to the source of inoculated material. The abscess of the previously described type has likewise been reproduced with pus from a case of Vincent's angina, from ulceromembranous stomatitis and from marginal gingivitis.

"However, if the secretions come from a mild case of Vincent's angina or from slightly indicated marginal gingivitis, approximately one out of two times the lesion does not develop or does so very minutely (abscess scarcely the size of a lentil).

"It also often happens when the dose is insufficient and the inoculation too superficial the abscess opens of itself at the end of from eight to ten days. The lesion has then a chancre form. It is covered over by a false whitish putrid membrane beneath which spirochetes swarm. The ulcered lesion quickly evolves toward healing.

"Active immunization of guinea pigs seems very difficult to obtain, if not impossible. Certainly the same holds true for man, in whom buccal spirochetes so easily take on the characteristics of almost inveterate chronic affections. Experiments made with mixed cultures will, to a certain degree, allow us to understand the reasons for this.

"Twenty guinea pigs were inoculated with various mixed cultures. By repeating Paul's experiment, we brought about putrid lesions through inoculating a guinea pig with a culture containing spirochetes, fusiform bacilli and cocci. We carried out two experiments of this kind, one with a culture of *Spirocheta tenuis,* fusiform bacilli and strepto-viridis, the other with a mixture of *Spirocheta dentium,* fusiform, and white staphylococci. Two c.c. of each of the mixed cultures were injected subcutaneously in two guinea pigs. The lesions produced were very similar to those which would have been produced by subcutaneous inoculations of pyorrheal secretions.

"On the other hand, separate inoculations of the guinea pig with germs connected with spirochetes produced no lesion whatever. We injected with impunity 4 c.c. of a mixed culture of fusiform bacilli and white staphylococci, but the addition of a trace of spirochetes to this mixed culture sufficed to make it pathogenic and to create the characteristic lesion in a few days.

"We think that these experiments suffice to prove the capital role that spirochetes play in the pathogenicity of necrotic lesions. No doubt the demonstration would be more complete could we reproduce these lesions by inoculating animals with pure cultures of spirochetes. But so far we have not in this respect been very much more fortunate than our predecessors.

A pure culture of *Spirocheta dentium,* which we kept several weeks was harmless to laboratory animals. But this germ had been transferred often (16 transfers) and in this way may have lost its pathogenicity.

"Another stock of *Spirocheta dentium,* this one connected with streptococci of the mouth, was slightly pathogenic to the guinea pig. Four c.c. of mixed cultures brought about a slight subcutaneous abscess.

"But a dose of this culture, inoffensive in itself, added to 1 c.c. of serum culture of fusiform bacilli (dose separately non-pathogenic) sufficed to produce in twelve days a subcutaneous putrid abscess the size of a small nut in the guinea pig.

"Similarly we were able to reactivate a culture wherein the *Spirocheta tenuis* was connected with streptococci and with an unidentified anaerobic bacillus. This impure culture, non-pathogenic in itself, became pathogenic when inoculated with fusiform bacilli.

"Finally we have very recently obtained a mixed culture of *Spirocheta acuta* and fusiform bacilli. These two germs grown together in bouillon ascitic-kidney of rabbit were pathogenic for the guinea pig.

"In these last experiments, the lesions differed in nowise from those produced by inoculation of gingival secretions.

"In conclusion, we believe that we have demonstrated that necrotic affections of the mouth are chiefly caused by spirochetes. (Truly there is no question of a spirochetosis caused by the hypothetical Vincent's spirochete, but indeed of spirochetes, all pathogenic and often associated among themselves.)

"We have already distinguished three forms of them. It is likely that we shall be able to describe more.

"However, all of these organisms, as different as they may be, have the common characteristic of being increased in their pathogenicity by the fusiform bacillus. We are thus enabled to understand the constancy of the fusiform bacillus in lesions and its localization in the immediate neighborhood of the necrotic zone in which spirochetes alone swarm.

"The plurality of pathogenic spirochetes further explains the difficulty of vaccinating animals with repeated inoculations of gingival secretions.

"Lastly, we understand that arsenobenzols make up the favored treatment for these affections. Once the spirochetes disappear through action of medication, the non-pathogenic fusiform bacillus is quickly phagocytized and the fuso-spirillary symbiosis is destroyed at the same time."

TREATMENT

The use of perborate of soda for ulcerative lesions of the mucosa was suggested in 1907 by Hartman.[3]

"Because of the favorable effect on suppurative processes of the mucosa which the author has obtained with sodium perborate both in the hospital and in private practice, he recommends it for further testing. He has used it in suppurations of the middle ear, catarrhal, and particularly ulcerative processes in the nose, in the pharynx and in the larynx and has found that it is an excellent disinfectant and curative drug. He considers it superior to any of the drugs used up to the present.

"Previously in treatment of acute and chronic suppuration of the middle ear (in acute after the first stage of inflammation has passed) the author used to use hydrogen peroxide for cleansing and then after drying to follow with boric acid, according to the recommendation of Bezold. Recently he has replaced the boric acid with sodium perborate, which has surpassed the curative effect of the boric acid in many cases and has the advantage of being painless and comfortable to use.

"The effect of the drug on ulcerous processes is shown by a case of secondary syphilis in which there was an ulcer about the size of a mark on the posterior wall of the pharynx, extending over to the posterior palatine arch.

"The ulcer was so painful that the patient could swallow only with great pain. After removal of the coating sodium perborate was blown in abundantly,

with immediate cessation of the pain on swallowing, so that the patient could eat without discomfort.

"Severe ulcerations in tertiary syphilis were also favorably influenced by blowing in sodium perborate. The crust formation disappeared, and the surfaces of the wound cleaned themselves rapidly."

Hartman then discusses his bacteriological experiments in which the perborate was found superior to boric acid, and the instrument which he perfected for blowing in powder.

We first tried perborate as a super-saturated solution, directing the patients to use it as a mouth wash and gargle and on the tooth brush every hour during the acute stage, then less often as the lesions progress favorably.

Recently we included the frequent use of the powdered drug in an insufflator, held dry on the tongue or massaged into the gums with a soft tooth brush. We believe that the brush is particularly beneficial, because it acts like a curette, destroying the granulations and cysts, thus exposing the organisms and permitting direct contact with the drug. When powdered perborate of soda is applied in the mouth, it slowly dissolves and a great amount of oxygen is liberated with much foaming. This we believe distributes the undissolved powder and liberated oxygen into many crevices around the gums, where a solution does not ordinarily penetrate.

In some cases the spirochetes appear to be very resistant to arsenic medication, and in this type of affection perborate of soda acts like magic. This was strikingly illustrated in a case of scurvy which had received four doses of neoarsphenamin intravenously and in whose buccal lesions the spirochetes continued to swarm. Pyorrhea and gingivitis cases improve rapidly when the powder is massaged into the gums with the fingers.

CONCLUSIONS

(1) There is a group of ulcero-necrotic lesions of the mouth, throat and nose caused by one or several of a group of spirochetes common to this region.

(2) Several types of buccal spirochetes have been isolated.

(3) The fusiform bacillus (Vincent's) found with the spirochete is by itself non-pathogenic, but has a synergistric action on the spirochete.

(4) The spirochete rapidly disappears from the lesions when the lesions are vigorously massaged with powdered perborate of soda.

(5) Perborate of soda is practically harmless and is a valuable remedy, particularly with infants.

(6) Bleeding is a prominent symptom of spirochetal infection.

BIBLIOGRAPHY

1. Ann. Otol. Phenol. and Laryng., 34:1123, 1925.
2. Halstead, T. H.: Year Book Eye, Ear, Nose and Throat, 3:298, 1913.
3. Krtchewski, B., and Seguin, P.: Memoires Originaux. Spirochetose Buccales—Reproduction experimentalis et traitment. Revue de Stomatologie Masson et Cie. Editeurs, 120 Boulevard St. Germain, Paris, pp. 613-643, 1920-1922.
4. Hartman, Arthur: Die Verwendung des Natrium perborium bei der Behandlung von Ohren, Nasen, Rachen, und Halskranken. (The use of sodium perborate in the treatment of Diseases of the Ear, Nose, Pharynx and Neck.) Deutsche med. Wxhnschr., Berl. and Leipz., 30:1538-1540, 1907.

DISCUSSION (Abstract)

Dr. Harry R. Slack, Jr., Baltimore, Md.—As Dr. Carpenter has pointed out, the lesions are most commonly found in the tonsils and the gums. They can usually be detected by inspection and confirmed by bacteriological smears.

As there seems to be an increase in this type of infection, a simple, practical treatment such as we used in the Army has its advantages. We gave the patients hydrogen peroxide with instructions to cleanse the gums or tonsils thoroughly, then to apply Fowler's solution of arsenic three times a day. This was particularly useful where we could not keep the patient under supervision.

Of course, now we always recommend sodium perborate as being the most important therapeutic agent. If we can get our patients to use it conscientiously, 80-90 per cent yield very promptly to treatment, no matter what other chemical agent we employ.

It is interesting to hear Dr. Carpenter's conclusions that the spirochete is the active cause. As yet the bacteriologists with whom we are associated are not willing to admit that the spirochete is the primary etiological factor. They still insist upon the association with the fusiform bacillus, as a great variety of spirochetes can be obtained from normal mouths.

The intravenous injection of arsphenamin, neoarsphenamin, or some such agents hastens the cure of the disease, but except in advanced cases (usually where treatment has been delayed) we have never found it necessary. The simpler, local measures are preferable.

Dr. W. B. Gill, San Antonio, Tex.—During three years' service in Germany, I was in an eye, ear, nose and throat clinic at Coblenz, where we had over four hundred cases. I made some observations, both bacteriological and clinical, which will be published later. We found there were certain predisposing factors which really came within the province of the dentist. I think Dr. Carpenter referred to dental caries and calculi.

There has been a great deal of controversy concerning the bacteriological cause of this trouble. Von Elleman said there were two forms of fusiform bacillus, long and short, and that the short form bore some relation to the spironema. Research workers have demonstrated that the spirochete is always associated with the fusiform bacillus in invasion of the lymphoid tissues. We found in the series studied in Germany that gingivitis seemed to be associated with tonsillitis in 40 per cent of cases. That emphasizes the necessity of dental co-operation.

In determining the effect of treatment we have used bacteriological control, but we prefer the dark field for

that purpose. However, we are not absolutely against the use of a smear as a means of control. We prefer to treat cases locally for five days, and if our dark fields are positive at the end of that time, then we resort to intravenous therapy with arsenic. We have seen the carotid artery exposed in one case of this kind twice, and invasion of the inferior maxillary in one case. One of the cases bled to death and the other patient was in the hospital for three years after the termination of his infection.

Perhaps the streptococcus plays an important role in the production of Vincent's angina by preparing the tissues for invasion by these two organisms. Usually the mouth in Vincent's angina is acid, and we know that the streptococcus grows in an acid medium. Our most effective local treatment is with alkalis. We have found that the use of sodium oleate in treating twenty-five clinical cases resulted in a cure in 7.1 days. The use of a good dentifrice containing a high percentage of soda is an excellent prophylactic measure which should not be neglected. When the cases fail to yield to the arsenic treatment, perhaps it is because the organism has become tolerant to arsenic. Then we ought to institute some other measure. There may be a carrier stage in Vincent's angina and we should attempt to clear this up.

Dr. D. D. McHenry, Oklahoma City, Okla.—During the War an army surgeon, in treating one of these cases, failed to find the solution he wanted on his cabinet, so painted the man's throat with 10 per cent copper sulphate solution. He was so much better the next day that he continued the treatment and treated quite a number of cases following this one with 10 per cent copper sulphate. I have used it ever since with great success. I use perborate of soda in strong solution as a gargle every two or three hours; paint with copper sulphate the severe cases twice daily, the other ones once, and have been able to cure every case.

Dr. Arthur Weil, New Orleans, La.—A treatment that has been most successful with us has been a mixture of emetin, arsenic, and glycerin, locally applied. Of course, we know what emetin is supposed to do in spirochete infections, and we also know that the arsenical preparations are very effective. We have found it necessary in only two or three cases to use arsenic intravenously, because the patients respond promptly to local treatment with emetin and arsenic.

Dr. Carpenter (closing).—I have mentioned only the high points and tried to emphasize the fact that I believe the spirochete is the energizing agent and that perborate of soda is a good remedy. In our hands it has proved thoroughly efficacious. The literature is full of remedies, but perborate of soda, being so simple, harmless and cheap, is worth our serious consideration.

HEAD INJURIES*

By C. E. DOWMAN, M.D.,
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As a text for a few remarks in regard to the classification and treatment of head injuries, I wish to present the salient facts from the record of a patient who was recently under my care at the Grady Hospital.

The patient was brought to the hospital one month after receiving an injury to the head. According to the history, the injury was not considered a very serious one. The patient received a blow on the head and was rendered unconscious for a few hours. After remaining in bed for two or three days, he was able to be up and about. The only symptom which he complained of following the accident was severe headache. The headache continued and gradually became so severe as to cause the patient to come to the hospital for relief. On examination, the veins of the forehead were tremendously distended; there was a marked bilateral choking of the optic disc; the blood pressure was considerably higher than normal; the spinal fluid was under increased pressure and was yellow in color; the x-ray did not disclose the presence of a fracture.

It was quite evident that this patient had a marked increase of intracranial pressure as the result of the apparently trivial head injury. The increased intracranial pressure was considered as being caused by an accumulation of fluid within the cranial cavity.

Naffziger described conditions of this type several years ago in an article published in the *Journal of the American Medical Association.* The fluid in such cases is usually between the dura and the arachnoid, and not in the subarachnoid space where the cerebrospinal fluid normally circulates. It is interesting to speculate as to how the fluid gets between the dura and the arachnoid. The most plausible explanation is that at the time of the injury there are definite contusions of the brain and small tears in the arachnoid, which thereby permit the fluid present in the subarachnoid space to escape into the subdural space. It is physiologically impossible for fluid to be absorbed from the subdural space as the normal cerebrospinal fluid absorption takes place from the subarachnoid space through the arachnoid villi by means of a process of seepage. When fluid, therefore, escapes from the subarachnoid space into the subdural space, there occurs a definite increase of intracranial pressure with the symptoms and findings presented by the patient under discussion.

How should we treat such a patient? One might argue that repeated lumbar punctures would withdraw the fluid and thereby relieve the increased intracranial pressure. As a matter of fact, it is impossible to remove subdural fluid in a case of this type by means of lumbar puncture. The explanation of this is that the lumbar puncture needle removes fluid from the large spinal subarachnoid space and not from the subdural space. Therefore, the treatment indicated in a patient of this type is to remove a small

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area of bone under the temporal muscle and make an incision into the dura so as to allow the accumulated fluid to escape. When this is done, the subdural fluid is usually found to be under such enormous tension as to cause it to spurt out through the dural opening to the height of several inches. The brain itself is usually found to be actually decreased in volume on account of the pressure exerted by the subdural fluid accumulation.

In the case under discussion, such an operation was performed. As soon as the dura was opened, yellowish tinged fluid spurted out to the height of twelve inches. The dura was left open after the fluid had been allowed to drain away and the wound in the overlying tissues was closed. In order to prevent a reaccumulation of the fluid the patient was put on the so-called hypertonic treatment to be discussed presently. The result in this case was a disappearance of the headaches, a rapid subsiding of the choked discs, and an otherwise uninterrupted recovery of the patient.

Before discussing the treatment which we believe will prevent the occurrence of the condition described in the case just reported, I should like to give briefly the classification of cases of head injury which we use in studying and treating patients of this type. The classification is as follows:

(a) Massive brain injury, with evidence of rapid exhaustion of the medullary centers, and death within one to several hours after admission, regardless of the type of treatment instituted.

(b) Definite evidence of middle meningeal hemorrhage.

(c) Simple or compound depressed fracture, with localized brain contusions, with or without indriven bone fragments.

(d) Classical manifestations of rapidly increasing intracranial pressure, which are well within the period of medullary compensation.

(e) Definite evidence of brain injury exhibiting no classic findings of acutely increasing intracranial pressure, yet of the type that experience has shown is liable to develop gradually increased intracranial pressure due to fluid accumulation.

(f) So-called "concussion" with no evidence of gross brain damage.

(g) Depressed fracture of a mild degree, giving rise to no symptoms whatsoever.

(h) Extensive scalp lacerations, without damage to the underlying structures.

To this classification should be added another type of brain injury which is occasionally encountered. The picture presented in this type is briefly as follows: (1) profound unconsciousness, (2) normal or subnormal blood pressure, (3) rapid pulse and rapid respiration, (4) hyperpyrexia, and (5) paralysis of one or more extremities (usually hemiplegia). The injury in such cases is usually located within the center of the brain in the region of the veins of Galen. There is an effusion of blood in the basal ganglia and in the region of the internal capsule on one or both sides. There is no increased intracranial pressure, and in spite of all treatment such patients invariably die, although they may live as long as a week or ten days after the injury. This particular type of brain injury was beautifully described by Bagley in the *Archives of Surgery* about two or three years ago. I have seen four or five such cases in a series of some four or five hundred cases of head injury. This type is a fairly infrequent one, yet should be kept in mind by those handling a large number of cases of brain injury.

The patient under discussion belongs to *Class E*, according to the classification just submitted. We feel that cases belonging to this particular type of head injury can be successfully treated without operative intervention, provided they are put on the so-called hypertonic treatment soon after the injury has been received. The picture presented in patients of this particular type is usually fairly characteristic. There is more or less unconsciousness and frequently marked irritability. The deep and superficial reflexes may or may not be altered. Usually, however, the abdominal reflexes are absent soon after the injury and the deep reflexes are somewhat hyperactive. The spinal fluid is invariably blood-tinged and at times may show an increase in pressure. The blood pressure is usually within the range of normal, and repeated examinations fail to show any particular rise. The x-ray may or may not show the presence of linear fractures in various parts of the skull. In a case of this type one has definite evidence that there has actually occurred more or less widespread brain contusion. There is no acutely increased intracranial pressure, however, and, therefore, no indication for any decompression operation. Experience has shown that patients of this type are liable to develop gradual increase of intracranial pressure due to fluid accumulation, unless they are treated in such a manner as to prevent, if possible, the accumulation of fluid. The patient under discussion illustrates such a progress of affairs when no such treatment is instituted.

In a series of some four or five hundred cases of head injury handled by my associates, Drs. Weaver and Cochran, and myself, approximately 50 per cent have fallen into this particular group. Since Weed and McKibbon demonstrated the action of hypertonic saline solutions in reducing

fluid within the cranial cavity we have been treating this particular class of cases by the so-called hypertonic method. We give one-half ounce of a saturated solution of magnesium sulphate without water every two hours for about two days. After this, the time of administration is lengthened to every three hours for a day or so, then every four hours, then every six hours, and so on, until by the end of ten days the drug is entirely withdrawn. No plain water is given, but hypertonic fluids are allowed between the periods of administration of the magnesium sulphate. If the patient is unable to take the drug by mouth, two or three ounces of magnesium sulphate dissolved in six ounces of water are given by rectum every twelve to twenty-four hours. If such a solution is not retained, we then give 10 c.c. of a 10 per cent solution of magnesium sulphate intravenously every four hours for about six doses, after which the drug can usually be given either by mouth or by rectum. The magnesium sulphate, by withdrawing, as it were, into the intestines fluid from the blood stream, renders the blood hypertonic to a certain extent. In order for the blood to be brought back to an isotonic condition, fluids are withdrawn from the various tissues and fluid-filled cavities. In this way, fluid within the cranial cavity is taken up by the blood stream to such an extent as to prevent the enormous subdural fluid accumulation present in the case under discussion.

"The proof of the pie is in the eating." As already mentioned, about 50 per cent of some four or five hundred cases have been treated exclusively by this method. None of these cases has been subjected to operation, and of the whole series only one died. Most of this particular group left the hospital without any residual neurological manifestations. The one death occurred rather early in our experience with hypertonic solutions when we were using hypertonic sodium chloride intravenously. The cards were so overplayed in this case as to cause the patient to develop a secondary edema of the lungs which resulted fatally. We now believe that sodium chloride in hypertonic solutions should not be given in the treatment of head injuries. Our reason for this is the fact that sodium chloride is a dialysable drug, and, therefore, a certain amount of sodium chloride will go into the cells themselves. Such sodium-chloride-logged cells will in turn pick up, as it were, fluid from the blood, thereby giving rise to a distinct secondary wave of edema. Magnesium sulphate, on the other hand, is a non-dialysable drug, and such a secondary wave of edema will hardly take place if it is used within the limits of safety.

The treatment used in the other mentioned types of cases differs very little from that practiced in other clinics. Those cases falling under Class A die regardless of the type of treatment instituted. We keep them under observation in the hope that they may have to be reclassified and then receive the treatment indicated for that particular type. Unless the clinical picture changes, however, and the first estimate is proven to be wrong, no particular treatment is indicated. The so-called concussion cases are kept under observation for about three days and then discharged. The other types of cases are subjected to immediate operation, the type of operation depending upon the particular type of damage encountered. Patients exhibiting the rather rare type of injury described as being due to contusions in the region of the veins of Galen have all died regardless of the treatment instituted. On account of the one-sided paralysis, two of these cases were subjected to subtemporal exploration. In both of them, instead of finding an epidural or subdural blood clot with increased intracranial pressure, we found the pressure within the cranial cavity was actually negative in character. As soon as the bone was removed, the dura could be seen sagging away, as it were, from the field of operation. As soon as the dura was opened, the brain was so decreased in volume as to fall away from the overlying dura, leaving a space between the dura and the brain fully 1 cm. in width. These cases were operated upon because we were not sure that they actually belonged to such a grave type of injury. I am now thoroughly convinced that cases presenting profound unconsciousness, rapid pulse, hyperpyrexia, and low spinal fluid pressure should not be operated upon, even though apparent localized paralyses are present.

You have probably noticed that I have said practically nothing about fractures of the skull. My apparent neglect of the use of such terms has been deliberate. I am well aware that there are many who still consider injuries to the head in terms of fractures of the skull. This I am sure is a great mistake. We believe that all cases of head injury should be considered from the standpoint of brain damage. The degree of brain damage should be estimated as far as possible by clinical observation, and the type of treatment instituted which seems indicated in each individual case.

The case under discussion unquestionably had definite brain contusion which resulted in the accumulation of

fluid to such an extent as to give rise to marked increased intracranial pressure. The yellow spinal fluid indicated that there had actually occurred a certain amount of hemorrhage in the subarachnoid space, the yellow color being caused by the blood pigments which still remained in the cerebrospinal fluid. On careful x-ray examination there was no demonstrable fracture present, and it is quite possible that there was no fracture of the skull in this particular case. In spite of this, the patient sustained a serious injury to the brain.

One should keep in mind the fact that the skull is an irregular sphere, and just as a football changes its shape momentarily as the result of being kicked, so the skull as the result of some sudden impact may undergo an instantaneous change in shape. This may not exceed the normal limits of elasticity of the skull itself but yet may cause the brain which is encased within the skull to be squeezed, as it were, to such an extent as to cause actual contusions and lacerations of the brain tissue. On the other hand, it is possible for the skull to have very extensive fractures and yet for the underlying brain to escape actual damage. If, therefore, the medical profession persists in estimating the gravity of cases of head injury according to the presence or absence of fractures of the skull, many serious cases of brain damage will continue to be overlooked, and the gravity of the situation will not be appreciated until too late to institute the proper type of treatment. I do not mean to say that such cases should not be x-rayed for evidence of fracture. As a matter of fact in the case of depressed fractures, it is rather important to determine, if possible, by x-ray study the depth of the indriven bone fragments. Only recently by studying the position and the depth of a depressed fracture I was able to predict that the lateral sinus had been torn by the indriven bone fragments. With this in mind, I prepared myself with a piece of muscle from the patient's calf before beginning the operation on the skull, as the use of muscle grafts is by far the best method (if not the only method) of checking hemorrhage from a torn sinus, unless, of course, the sinus be actually doubly ligated. In this particular case, as was expected, the sinus was found torn and the hemorrhage quickly controlled by means of the muscle graft. The interest in linear fractures, however, regardless of their position is in the main academic, and has very little influence on the type of treatment which may be indicated in the particular case under observation.

Before closing, I should like to say one word in regard to the routine use of lumbar puncture in cases of injury to the head. It is well recognized that in the presence of chronic increased intracranial pressure lumbar puncture is a dangerous procedure on account of the possibility of causing a herniation of the medulla into the foramen magnum, with the consequent failure of respiration. I do not believe that this danger exists in cases of injury to the brain. It is true that occasionally where there is tremendous hemorrhage below the tentorium the patient may die soon after lumbar puncture is done. The death in these cases, however, can hardly be due to the lumbar puncture but is due rather to the tremendous medullary compression caused by the rapid accumulation of blood in the posterior fossa. I am well aware that some most excellent neurological surgeons condemn lumbar puncture in traumatic cases, notably Dr. Ernest Sachs, of St. Louis. We have many arguments on this subject, with the usual result that he continues to have his opinion, and I continue to have mine. As a matter of fact, we use lumbar puncture as a routine as soon as the patient is admitted. We feel that it helps in the proper estimation of the type of injury. If the spinal fluid does not contain blood, it is reasonable to conclude that actual superficial contusions of the brain have not occurred. In a case of middle meningeal hemorrhage, for example, unless the brain is likewise contused, the spinal fluid is clear. In all cases of so-called concussion, the spinal fluid is free of blood. We likewise feel that it is of some value to estimate the degree of spinal fluid pressure as an aid to diagnosis and the proper classification of the case. On the other hand, I do not believe that repeated lumbar puncture has the therapeutic value which has been claimed by many observers. This, however, still remains a disputed question.

I have attempted in the time allotted to me to give you a brief resume of our experience with head injuries. There are some, I realize, who consider the classification mentioned as too elaborate for practical application by the average practitioner of medicine. In this I do not agree. Our interns seem to have no trouble whatsoever in learning how to classify the average case of head injury according to this scheme. Surely a recent medical graduate has no greater clinical acumen than the average physician of several years' experience. Cases of head injury are becoming more and more frequent on account of the ever-increasing number of automobiles. These cases cannot always be sent to the various medical centers for treatment. I have no doubt that every man present has had to handle one or more of them. If, therefore, our

own experience as outlined in the preceding scattered remarks should prove to be of any value to any one of you, I shall indeed be very happy.

STIFF JOINTS*

By FRED G. HODGSON, M.D.,
and
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There are various types of stiff joints. There is a mild form following sprains, dislocations, and even simple prolonged immobilization in a cast. Contusion of the cartilage will cause some stiffness in a joint. In these mild cases, adhesions form about the joint that limit their motion. You can see this in a dislocation of the elbow. There will be some tearing of the ligaments or chiping off of bone, and as healing occurs there will be stiffness unless the joint is carefully handled. The joints can usually be restored to normal by breaking up or stretching the adhesions. There are certain points that must be borne in mind. In breaking up adhesions, one must be very sure that there is no arthritis present in the joint. In a joint where arthritis is present, manipulation makes it worse by increasing the inflammation. A very good way to distinguish between arthritis and adhesions is by a test of this sort: in arthritis motion of the joint is limited in all directions. If we flex or rotate it in any way, we get pain. If the joint motion is limited by adhesions, there are certain motions which are not painful. The pain is not set up until the adhesions are put on the stretch. In loosening up the milder forms of stiff joints, it is best to go slowly. Do a slight manipulation and watch. If you stretch an adhesion and the joint motion tends to improve, see if it continues to improve. When you are sure that you have adhesions limiting the joint and not arthritis, the best thing to do is to give an anesthetic and then put the joint through the whole range of its motions once. In the shoulder joint, which is frequently injured from falling on the hand as in cases of Colles' fracture, in about two weeks the patient will complain of soreness in the shoulder. When the arm is taken out of the sling, the joint will be stiff and the patient cannot get the proper motion of the shoulder. There is often as much trouble in the shoulder as in the fracture of the wrist. In cases of adhesions about the shoulder joint, the thing to do is to put the patient under a general anesthetic. First, test the range of normal motion in the uninjured shoulder. Take the arm carefully in your hands and carry it out from the side and stretch all the adhesions. You can often hear them break with considerable noise. Those that grate during motion are the adhesions inside the joint. The arm should be carried through the complete range of motion in all directions and that will break up the adhesions. The next day one must move the arm through its complete range of motion once. This must be done to prevent the adhesions from recurring. Heat and other measures can be used to relieve the pain and congestion. It is a bad plan to use the pump handle motion, and also a very bad plan to attempt this manipulation on a joint that has been infected, for it can very readily set up a recurrence of the infection.

If there is an exostosis about a joint limiting its motion, that can be relieved only by operation. After the femur has been put up in a cast for six to eight weeks, for instance, the knee joint is usually very stiff. The x-ray shows nothing wrong and those joints can often be relieved by gradual motion. If the knee is put in a Thomas splint and a bandage is put over the upper part of the thigh, and the knee allowed to fall down by gravity, this will gradually overcome the stiffness. In certain cases in which the adhesions are very strong, we have to give an anesthetic in order to break them up. In a true ankylosis, where the joints have grown together, the condition cannot be overcome without operative procedure. If the joint is ankylosed in a favorable position for function, a patient can get along without much inconvenience. There is not much disability with a stiff knee in a straight position, and it is not necessary to operate. If an elbow is ankylosed at about 90° it is very useful, and we do not have to break up the ankylosis, but if the elbow joint is ankylosed in a bad position we have to do something to improve it. An elbow that is ankylosed in a straight position is very inconvenient. We have a position of election in which we know the joint will give the best results. We put the joint in the best position for function when we know it will become ankylosed as in cases following gunshot wounds. If the shoulder

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joint is ankylosed in about 60° abduction, there is a scapular motion which allows the shoulder to come down and will give a good functional result. The best position for the elbow is about a right angle. The best position for the wrist is dorsal flexion, and the wrist should always be placed in dorsal flexion when one knows it will become ankylosed. In ankylosis of the hip, the best position is slight flexion. The best position for the knee is the straight position, where it will take the body weight in a straight line, although some prefer a slight flexion, because the patient can walk with a little less limp. The best position for the ankle is a right angle.

If a joint is ankylosed in a bad position, several things can be done. Take, for example, an old tuberculous knee joint where the knee is flexed and dislocated backward on the femur. We have to take a wedge-shaped piece out of the lower end of the femur, or do a simple osteotomy. Why not make a new joint by means of an arthroplasty? This has been attempted in various parts of the body and various methods have been used. One method is to cut out a piece of bone between the joints and then insert a piece of fascia to prevent the bones from growing back together. This has been done on practically all the joints of the body. Most men agree that the knee cases can be done, but the joint is apt to be unstable and painful unless the work is done by an expert. A few men have obtained good results. The hip joint is very difficult to handle to get a good functioning joint. In the cases with both hips ankylosed, an arthroplasty is justified. If only one hip is involved, I do not think such an operation is justified. Another method of treatment is excision, which is used more often in the upper extremity. The ends of the bones are cut off and a false joint formed. This is not very serviceable, but it is better than a stiff joint. (Presenting patient.)

This girl came to the clinic with a perfectly straight elbow which she could not bend at all. The history indicated an arthritis of some type. The history was vague, but it was a destructive arthritis which completely destroyed the cartilage. The x-ray showed no space between the ulna and the humerus. We could do two things, cut out the joint entirely and get a movable joint, or do an arthroplasty. We decided to do the arthroplasty in this case. We first put the ulnar nerve out of the way and then the olecranon was cut off and turned up with the muscle attached. The humerus and ulna were chiseled apart. The lower end of the humerus was freed of soft tissues and about three-fourths inch was sawed off. The olecranon fossa was chiseled out so that we had a free joint. Then we made an incision on the thigh and took out a piece of fascia lata and sewed it in place over the humerus so that it could not unite with the olecranon. We then put the arm in a cast for three weeks, with the elbow flexed at 90°, when massage and active motions were begun. The joint was perfectly stiff with no motion whatever before the operation. Now the patient uses the arm every day for sweeping and doing her ordinary housework. The arm is not very strong, but it is perfectly stable, and she has not a flail joint. She can do practically everything she needs to do with her arm, and it is very much more useful than before operation. She has about 40° free, painless motion.

CHRONIC ENDOCARDITIS*

By J. A. McGARITY, M.D.,
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The case I wish to report is one of a young man, age 27, born and raised in southern Georgia, a farmer by occupation. His mother, father and one brother are living and in good health. There is no tuberculosis or cancer in the family. He married at 19. His wife and three children are living and in good health. No children have died, and there have been no miscarriages. He had the usual childhood diseases; also he had mild attacks of tonsillitis, but never severe; hookworm at the age of 10; rheumatic fever at 14; and influenza in 1919, when he was in bed ten days. He does not use tobacco, alcohol, or tea. He is a moderate coffee drinker. He has had no former operations.

He came to the office October 25, 1926, his chief complaint being a rapid heart rate, which he had noticed for twelve years. He had had acute rheumatic fever at 14 or 15, which lasted for four years. He would be in bed for two or three weeks, up and around, and then down again. He was well after that for five years, during which time he was able to work at hard manual labor, such as lifting and hauling railroad cross-ties. His physician discovered he had heart trouble, but he seldom has had any pain in the region of the heart. He had had moderate dyspnea, but now was unable to lie down on account of shortness of breath. He had no vertigo, but extreme weakness and complained that his feet were cold and he frequently became weak. The arthritis which he had at 15 was confined largely to the right side, primarily the right wrist, elbow, shoulder and knee. There was nothing inflammatory on the left side. His appetite was not very good. His stomach "swelled" when he ate and his heart beat fast after eating. He had no heartburn or nausea; had been constipated for some time. He seldom had headache, but had been nervous since he left home. He gave his normal weight as 156 pounds. At the time of examination he weighed 143. His weight should have been 160 pounds for his height of 5 feet, 10 inches, and his age. His blood pressure was 130/80 and pulse 150. He had a large heart with notable arrhythmia and multiple premature contractions. The heart beats were diffuse, the apex beat being maximal under the left breast. There was diffuse impulse in the fifth interspace which did not produce retraction of the chest wall. The liver was down four or five finger breadths below the costal margin, and tender. A prominent systolic murmur of mitral regurgitation was heard over the entire anterior chest, but best at the apex. It was transmitted into

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the axilla and to the angle of the left scapula behind. The eyes showed icteroid sclerotics; the pupils reacted to light and to accommodation. Throat examination revealed small chronically diseased tonsils. There were rales over the bases of both lungs.

Laboratory Examinations.—A single specimen of urine on October 25, was acid, albumin was 4 plus, sugar negative, bile positive, and there were casts, red blood cells and occasional pus cells. The phenolsulphonephthalein functional tests showed 78 per cent of the dye excreted in two hours and fifteen minutes. The hemoglobin was 63 per cent, with leucocytes 14,400. A stool examination was negative for ova and parasites.

On November 12 he was brought to the hospital and a full examination was made. The urine was acid, albumin negative, sugar negative, indican 3 plus, there was an occasional pus cell but no casts and no red blood cells. Another blood count on November 12 showed 65 per cent hemoglobin; red blood cells, 4,100,000; white blood cells 5,500; lymphocytes 35 per cent. Careful search of the blood failed to reveal any malaria plasmodia. The Wassermann was negative. His spirometer test should be 3 to 9 liters for a man of his weight and occupation. He showed 2 liters, 17 days after being in the hospital. On October 29 a van den Bergh test was done. The early direct reaction was moderate, indicating a slight degree of jaundice of the obstructive type. This test was repeated on November 8. There was a slight reaction, indicating a mild degree of jaundice. The Rosenthal liver test showed 10 per cent retention of dye after 15 minutes and 6 per cent at the end of an hour, indicating mild impairment of liver function. I had some pictures made as he came through the office and others on November 12.

He has a hyperthrophied rather than a dilated heart. The fact that he was in bed for 17 days without any reduction in the size of the heart would rule out acute dilation. His pulse has come down from 150 to 50 to 60 a minute, and is practically normal in rhythm. He is much more comfortable and breathes with ease. He is sleeping flat in bed and insists that we let him go home as soon as possible. Some of you may think it probably a case of pericardial effusion, but if you listened to his chest you would be convinced that there is no fluid there. Also, under the fluoroscope, cardiac contractions were well-defined, and there was no evidence of fluid in the shadow upon change of posture.

COMBINED SURGERY-RADIATION TREATMENT OF INTRA-ORAL CANCER*

By FRED M. JOHNSON, M.D.,
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My purpose in conducting a clinic this afternoon is to draw attention again to the combined surgery-radiation treatment of intra-oral cancer. This is a very important group of tumors and one which is seen frequently at the Steiner Clinic. Since its opening two years ago, approximately fifteen hundred cases of malignant disease have been observed and treated, and of these about one hundred have been intra-oral in type. I am showing two patients who are representative of this group, but I must emphasize that since they have been clinically free of disease for only a little over a year, they serve to demonstrate method rather than result.

The first is a middle-aged man who came to the clinic eighteen months ago because of a sore that he had noticed on his tongue for about a year and three months. Ordinarily tongue cancer is far advanced before help is sought by the sufferer. Fortunately this patient came when there was definite hope of accomplishing something by treatment. The lesion was on the right side, the mid-point being opposite the bicuspid teeth. It was approximately 3 cm. in diameter and 1 cm. in thickness. In appearance, the growth was a typical squamous-cell carcinoma, ulcerated, and with raised margins. The induration was most characteristic. A small section of tissue was removed from the edge and examined by Dr. E. L. Bishop, who confirmed the clinical diagnosis of cancer. In addition, in the right side of the neck in the upper deep cervical chain were two firm lymph nodes each 1 cm. in diameter. They were distinctly felt and easily movable.

Pre-operative treatment was commenced without delay. The tongue and mouth area, and both sides of the neck, were exposed to high voltage x-ray under the supervision of Dr. R. H. Fike. Later, unfiltered glass radium emanation tubes were buried in the tumor and around it. Following this, there was a moderately severe local reaction as evidenced by pain, swelling and tenderness, with the formation of a fibrinous exudate over the entire ulcer. Four weeks later, under general anesthesia, the anterior two-thirds of the right half of the tongue was removed by the actual cautery, and when the specimen was examined by Dr. Bishop no definite cancer cells were found. A week later, a complete neck dissection was done on the right side under local anesthesia. The sternocleido-mastoid muscle, the internal jugular vein and all recognizable lymphoid tissue were removed. The vertical incision was extended anteriorly and the submaxillary salivary gland and lymphoid tissue around it resected. As the concluding step in the operation, glass emanation tubes were implanted not only at suspicious points but wherever lymphatics were severed. So far, in no instance have there been bad results from burying these tubules in the tissues of the neck. They are active for 132 hours, after which they are surrounded by scar tissue and in nowise interfere with wound healing when they are properly placed. The tissue removed from the neck was examined and only one node in the deep cervical chain was found to be cancerous. The other node that was palpable was swollen by inflammation. No cancer was found in the submaxillary lymphatic group.

The second patient that I wish to present this afternoon suffered from a cancer of the maxillary sinus. He is 64 years of age and just fourteen months ago came to the clinic because of the steady growth of a tumor in the roof of his mouth. He had received no professional attention for this except the advice of one physician who told him not to bother it until it bothered him. The swelling was on the left half of the hard palate opposite the molar teeth and involved also the adjacent alveolar process. It was the size of a walnut, firm in

*Clinic, Clinic Session, Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

consistence, and as yet there was no ulceration, but it was impending. No lymph nodes in the neck were felt. Radiographic study showed a cloudiness of the antrum and some destruction of its bony floor.

The usual treatment of the primary tumor and the neck lymphatics by x-ray was carried out. As a preliminary step to the surgical exposure of the interior of the antrum, the external carotid artery on the same side was doubly ligated. At this time, the lymphoid tissue along the deep vessels in the neck was carefully inspected and palpated, and although no enlarged nodes were found, as a precautionary measure several weak emanation tubes were buried. A few days later under block anesthesia, the floor of the antrum was removed by scalpel and cautery; it was then determined that while the tumor nearly filled the cavity only the floor was destroyed. The microscopic report on the tissue removed was cylindrical-cell carcinoma. A rubber finger-cot containing unfiltered emanation tubes was placed centrally in the sinus and held there by firm packing. At the end of twenty-four hours the packing was removed and the cot was shifted slightly downwards, and again left in position for twenty-four hours. A total dosage of about 4,000 millicurie hours was given. The local reaction was severe, and slough and small pieces of destroyed bone eventually were cast off. As soon as healing seemed complete an artificial denture with an obturator on its upper surface was constructed at the Atlanta-Southern Dental College. This simple appliance has removed all difficulty in speech and mastication.

In conclusion, I would like to emphasize the conservative attitude in regard to cervical lymph nodes. Their protective function is respected and only when palpable metastases appear is surgical removal advised. Squamous-cell cancer is unique in that it does not spread widely, seldom going beyond the first chain of nodes draining the tumor area. Furthermore, the spread is usually by embolism, and not by lymphatic permeation, and as a rule one or two nodes in the chain are all that are involved. It would appear, therefore, that the integrity of the lymphatics is one of Nature's lines of defense in preventing a generalized diffusion such as is found with the glandular types of cancer. Only when there is reasonable clinical evidence of nodal involvement is operation performed. Many patients with cancers never develop cervical metastases, and an expectant attitude spares them the ordeal of unnecessary operation. Once neck dissection is indicated, a combination of radical surgery and thorough radiation offers more advantages than either alone. Of course, conservative treatment is not justified unless patients are kept under absolute control. At the Steiner Clinic they are examined every two or three weeks for the first year and at a somewhat greater interval during subsequent years.

In regard to the removal of the primary tumor after thorough radiation, as in the first case, such a method shortens the period of painful healing that follows the implantation of bare emanation tubes. That radiation had controlled successfully the tongue lesion in this instance was shown by the complete absence of discernible cancer cells in the excised tissue. The radiation-excision method is probably only applicable to tongue tumors that are anterior. When the base is involved, the situation is so desperate and the results so disappointing, that it is questionable if anything more than palliative radiation should be attempted.

Just a word in reference to cancer of the maxillary antrum. Early cases are so infrequently seen that no method of treatment can be uniformly successful. As a rule, the bulk of tumor growth is mainly in one of four directions, namely, upwards to destroy the flow of the orbit; downwards to bulge into the mouth; laterally to form an external swelling; medially to fill the nasal passage; and the early signs and symptoms naturally will depend on the direction taken. For adequate radiation, adequate exposure is needed. Thus in some instances, in addition to making a window in the palate, an eye has been sacrificed earlier than would seem necessary in order to reach the tumor from above. One fortunate fact in the life history of most antral cancers is that a spread to the lymph nodes occurs comparatively late in the course of the disease. As a consequence, neck dissections are seldom undertaken and seldom accomplish good.

ACUTE MYELITIS OF TOXIC ORIGIN*

By C. C. TURNER, M.D.,
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The following three cases of myelitis are presented under the title of toxic myelitis with no small degree of hesitancy. Infectious myelitis or toxi-infectious myelitis might have been a more accurate label, but these terms are certainly less descriptive of the true nature and course of the cases.

Case 1.—M. G., a white girl of two years, was brought to my office November 12, 1925, by her mother, who stated that the child had been unable to walk for the preceding twenty-four hours. Two days before she first noticed that her legs gave way under her and she seemed to ease down to the floor. On another occasion she thought the child was just clumsy and was

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stumbling. Yesterday the child was unable to walk or stand even supported, although when lying down it could kick its legs about feebly. Nothing more could be ascertained about the history, except that she had some sort of gastro-intestinal upset one week before with slight nausea, vomiting and diarrhea of twenty-four hours' duration, which was attributed to a meal of bought cookies. She was bright and apparently normal until the onset of the present illness. There was no history of a recent acute respiratory infection, or injury.

The family history contained nothing unusual. The child had always been a robust, healthy baby before this illness. Her delivery was normal at full term. She sat alone and learned to walk and talk at the usual ages.

She was a well developed and exceedingly well nourished girl child, bright, in no particular distress, and interested in articles given her to play with.

Physical examination in general was normal.

Neurological Examination.—On examining the lower abdomen, I noted bladder distention well above the pubis. The mother, on questioning, stated that the patient had not voided any urine since early morning. The bowels had moved once.

The condition of the muscles under cranial nerve control was normal. The upper extremities and trunk were normal. When the legs were extended on the trunk, they both dropped limply to the surface of the table, but it was noted that the patient could abduct both legs slightly. The skin of the legs was normal in color, presented no edema and felt warm and normally moist. Both feet assumed complete extension. The reflexes of the upper extremities were normal. Both Achilles reflexes were abolished, as were the anterior tibialis and plantars. Both knee jerks were feeble, as were both lower abdominals.

Detailed sensory examination was impossible on account of the child's age. There were no apparent hyperesthesias or deep muscle tenderness, and no tender areas on pressure below the proximal heads of the tibia, or in the popliteal spaces, and no band of hyperesthesia around the trunk. No atrophies or dystrophias were noted, and the calf muscles were equal and of normal size and tone. The pupils were normal to light and accommodation.

The patient was admitted to St. Joseph's Hospital for lumbar puncture early the next day.

November 13, 1926, at 9:30 a. m., lumbar puncture was performed. The fluid was decidedly increased in amount and ran freely. It was clear, colorless and compression of the neck anteriorly increased the flow.

SPINAL FLUID EXAMINATION

Cell count, 3.
Globulin, normal trace.
Sugar, no reduction.
Wassermann, negative.
Culture, negative after 48 hours. No web formation.

BLOOD EXAMINATION

Leucocytes, 7600.
Polymorphonuclears, 67 per cent.
Small mononuclears, 26 per cent.
Large mononuclears, 7.
Wassermann, negative.

Following puncture, a voided specimen of urine was examined and showed:

Color, straw, clear.
Specific gravity, 1.010.
Albumin, negative.
Sugar, negative.
Casts, none; uric acidcrystals in excess.
Pus, none.
Blood, none.

The mother stated that the night before the child had voided a copious amount of urine after returning home from my office, but had voided no more until the above specimen was obtained.

Routine x-ray examination showed the sella turcica to be small. X-rays of the entire spine were normal.

She had no elevation of temperature while in the hospital. Four hours after puncture the pulse was recorded as 140 and the child was restless and crying. The mother insisted on taking the child home that night. She was instructed to give her a milk diet, catharsis and massage.

November 14, 1926, the condition was improved. The temperature and pulse were normal and the child had voided twice. The condition gradually improved and 10 days later examination in my office revealed a return of reflexes, and the child could walk, holding its mother's hand and mine. I saw her once more a week later, when she was apparently well and normal, with no residual paralysis or weakness.

Case 2.—C. H., a white boy of six years, lived in a rural district. He came to the city to visit his grandmother. Four days after his arrival he awoke at the usual time in the morning and told his mother that he could not move his legs. He had slept soundly the night before, and on the previous day was apparently well and played normally around the house with the other children of the family. No history could be elicited of any previous sickness or indisposition during several days or months prior to the present illness. He complained of no pain, but voided with difficulty when his mother held him over his vessel.

He had had measles and whooping cough at three years.

His family history was negative, and he had been delivered normally at term.

He was seen on the morning of the onset of symptoms October 12, 1925. He was sitting on the floor making a house of blocks and did not look sick. The general physical examination was negative. His temperature was 99.3° F., pulse 98, and respirations were 20.

Neurological examination showed flaccid weakness of both legs. He could not flex the left leg on the trunk, but could flex the right leg on the trunk in a feeble manner. He could flex and extend the left foot, but could not move the right. There was no bladder distention, and no history of obstipation.

The pupils reacted normally to light and accommodation as did the tendon reflexes of the upper extremities. The upper and lower abdominal reflexes were present and equal. Both knee jerks were barely present after reinforcement. Both Achilles reflexes were absent.

There was no loss or change in sensation over the involved area for touch, pain, temperature or bone conduction. There was some slight anesthesia of the perianal region. There was no hyperesthesia of the skin and no deep muscle tenderness.

The appearance, color and feel of the skin of the legs and feet was normal. There was slight diminution of muscle tone of the weakened groups.

The patient was transferred to the Methodist Hospital for lumbar puncture. He voided on admission.

Lumbar puncture showed the cerebrospinal fluid clear, colorless and under decided pressure. Compression of the neck increased the flow of the fluid.

SPINAL FLUID EXAMINATION

Cell count, 2.	Wassermann, negative.
Albumin, negative.	No webb formation, culture yielded no growth.
Sugar, negative	

BLOOD EXAMINATION

Total white blood cells, 14,400.	Large lymphocytes, 2 per cent.
Polymorphonuclears, 68 per cent.	Normal Differential.
Small lymphocytes, 30 per cent.	Wassermann, negative.

URINALYSIS

Amber, neutral.	Diacetic acid, negative.
Specific gravity, 1.015.	Casts, none.
Albumin, negative.	Pus, none.
Sugar, negative.	Blood, none.
Acetone, negative.	

The patient was put on a milk diet and given a saline purge. The next morning he was sent home, where he was given 3 grains hexamethylenamine each four hours. Slight improvement was noted in the condition.

On the following morning there was decided improvement. He could draw both legs up in bed and could move both feet slightly. The knee jerks had returned to some extent.

When he was seen one week later the patient appeared entirely normal and was again romping about the house with the other children.

Case 3.—C. L. S., a white baby boy was seven months old. The present illness dated from a fall to the floor two weeks before in which the child bruised its lip. Shortly after a rash appeared on the trunk and limbs and in a few days the patient seemed unable to move the right leg or either arm. For the preceding four days he had had fever, the mother said. (She did not take the child's temperature.) With this she had noticed an expiratory grunt which was present at examination. His appetite had not been disturbed during this sickness. There has been no gastro-intestinal upset. He was fed on eagle brand, the mother having had no milk since he was three months old. He was admitted to the hospital July 22, 1926.

The past history was negative for illnesses. The social history was of interest.

The mother and father were living and well. The baby's father was also his maternal grandfather. Subsequent examination of the mother, a girl 16 years of age, by the Memphis Child's Guidance Clinic, gave her a mental age of seven years.

The patient's temperature was 104.3° F., his pulse 120, and respirations 60. He was extremely sick. His color was pale and nutrition poor. A maculo-papular rash on the forearms was seen nowhere else.

The normal anterior fontanelle was open. There was anterior and posterior cervical adenopathy.

The chest showed a rachitic rosary. Rales were heard in both upper lobes posteriorly. Respirations were 60-70 per minute, with an expiratory grunt. There was tubular breathing in the upper apices.

The heart was normal, with rate greatly increased. The abdomen was tense and rachitic, the spleen not palpable. He showed paralysis of the left arm and weakness of the right arm. Breathing was mostly abdominal, with the upper accessory respiratory muscles enfeebled.

July 23, 1926, the upper left chest showed a large area of lobar pneumonia, with pure bronchial breathing, which was transmitted to the right chest. The heart sounds were rapid and weak, temperature 103.5° F., pulse 110, and respirations 60.

The blood showed 31,200 leucocytes, with 80 per cent polymorphonuclears and 20 per cent lymphocytes.

Urinalysis gave normal findings July 23.

Neurological Examination.—The patient lay with forearms across chest, both thumbs abducted, and fingers extended. There was complete flaccid weakness of the left upper and lower arm. The right arm showed definite paresis. There were no twitchings or fibrillary tremors of either arm or hand, or of the feet and legs. The muscles of both upper arms seemed flaccid and atonic. There was slight resistance of the neck to forward flexion. This did not seem to elicit pain, and no Brudzinski was present. Pupils were equal and regular and reacted to light. Both knee jerks were equal and apparently normal. Both Achilles were normal.

The cremasterics were equally active. The gag reflex was normal. The abdominal reflexes could not be definitely obtained, as the child cried and stiffened the abdominal musculature during the examination. There was no Kernig's sign.

An accurate sensory examination was not possible, but there seemed to be a generalized hyperesthesia. The child moved both legs in all directions, and when the soles of the feet were stuck a withdrawal and extension of the toes followed immediately. Sticking the hands and forearms resulted in no attempt at movement of these extremities. There was no difficulty in swallowing and no exophthalmoplegia.

Lumbar puncture showed a clear, colorless fluid under very little pressure. Compression of the neck anteriorly increased the flow of fluid.

Cell count was 3, globulin was normal, sugar negative, and Wassermann negative.

After that the temperature returned to normal by clysis on July 25. It hovered around 99-100° F., with one peak of 100¾ F., on July 27.

July 30, the temperature was normal and chest condition had apparently cleared up. The child was taking nourishment well and seemed to be generally improving. The neurological condition of the arms persisted. Respiratory movements of the chest appeared normal.

August 5 he developed otitis media. The right drum was incised and creamy pus exuded. The ear was treated in a routine manner and soon cleared up. Urinalysis was normal.

August 8, the patient showed definite improvement, with movement of the right hand and slight movement of the left.

August 10, faradism was tried on the arms with definite responses in the forearms and slight responses in the upper arms. The patient was gaining in weight.

August 15, the temperature was normal. Both hands and fingers moved about normally, and the movements of the upper arms were returning slowly.

August 17, the patient developed a diarrhea, which cleared up on a change in feeding.

September 1, he was regaining use of all the muscles of the arms and shoulder girdle. He was discharged to the social service for placing in an orphanage.

October 27, 1926, he was recalled from St. Peters Orphanage for special examination and appeared robust and healthy. He had grown considerably and gained in weight. There was still slight weakness of the upper

muscles of the shoulders without atrophy. The condition otherwise was normal.

In each case poliomyelitis demands first consideration. *Case 1* gives a suggestive history of the dromedary type, with the mild intestinal upset one week prior to the paralysis. The absence of a febrile condition or leucocytosis and the normal spinal fluid findings do not coincide with the picture of infectious myelitis. The final outcome is not the usual one, at least for poliomyelitis. The absence of any malaise, fever or prodromal symptoms of any nature in *Case 2* is unusual for polio or infectious myelitis. The total leucocyte count was increased, but there was no relative increase in cells and only a very slight rise in temperature. The spinal fluid was entirely normal.

In *Case 3* the diagnosis of poliomyelitis was made, but the subsequent course of the case, normal spinal fluid findings and marked improvement of the paralyzed muscles raised doubt as to its being a true polio. The consideration of an acute infectious process in the cervical cord seemed more probable, secondary to infection in the chest. The clinical findings of such a condition should have been those of a more diffuse lesion of the cord, which were absent. Also we should have expected the fluid to show at least a mild increase in cells with other evidences of a meningo-myelitis. Buzzard states in his Goulstonian lecture:

"Reference to the meningitis in this condition (infective myelitis) is no more necessary than is the reference to pleurisy, which undoubtedly complicates the great majority of cases of pneumonia."

However, Homen has shown that cocci tend to die out quickly in the spinal cord.

F. Joslin Jauch considers that complete, or even partial, recovery from infectious myelitis is rare. He reports one case of myelitis with recovery. Although the manifestations in his case were more severe than in either of the above three cases, the spinal fluid findings were similar in being entirely normal. The case presented evidence of complete transverse myelitis. In these cases, absence of a fibrin web formation in the fluid is noted. It is mentioned by Dubois that fibrin web formation in spinal fluid is exceptional, but does occur in polio. Morris and Jacobson state that infective myelitis is a vague term without septicemia, pleocytic cerebrospinal fluid or demonstrable infectious foci.

Toxi-infectious myelitis is an inapplicable term in the absence of foci of infection, or convalescence from acute infectious disease.

Olitsky and Kligler have demonstrated an exotoxin, or neurotoxin, in *Bacillus dysenteriae Shiga* by intraveneous injections in rabbits, which produced lesions in the gray matter of the medulla and cervical cord.

Hunt mentions that the spinal fluid may be free from any signs of inflammatory reaction in infective myelitis, but in his case reports the first puncture was not done until one month after the first symptoms. In the New York epidemic of polio in 1916, Draper found that cell counts in the spinal fluids never ranged under 100 in the cases presenting definite paralysis.

In a study of twenty-six cases of polio during a Detroit epidemic, Montgomery and Cole found that the degree of pleocytosis ranged from 10-800 and that in the central nervous types the cell count was 50 and upwards. They also advocate the value of early lumbar puncture in polio.

In conclusion, these three cases present clinical pictures of myelitis in which the pathological process seems limited to the ventral gray matter of certain definite levels. The process was evidently very mild, as two of the cases recovered completely, promptly after spinal drainage, and the third case shows marked improvement, which is continuing. We do not believe that either of the first two cases could be classified as cases of infectious myelitis, in which we include poliomyelitis, for reasons already referred to. *Case 3* was probably infectious myelitis related to the chest affection, but even in this case the findings were not in accord with infectious myelitis.

Since each of these cases recovered, we have no biopsy evidence upon which to make a definite pathological assumption. It seems reasonable to assume, however, that we may have localized cord edemas, as we have cerebral edemas, in association with an intoxication. Since the ventral gray receives the greater amount of the blood supply to the cord, it is to be expected that the functions of this portion of the cord are the most disturbed in the presence of a neurotoxin.

These cases are brought to your attention with the hope of stimulating an interest in mild cord lesions, for we believe that they occur more frequently than the paucity in the literature of such case reports would lead us to believe.

We also wish to stress the importance of early puncture in every case of myelitic origin, for it affords a quick means of escape for the neurotoxin, and aids the return of the sick neurone

to normality. It also furnishes an index as to the prognosis, which in the presence of a normal cell count and globulin content should be good.

REFERENCES

1. Jaunch, F. Joselin: Lancet, p. 512, Sept. 8, 1923.
2. Morris, Laird M., and Jacobson, Victor C.: Arch. Neu. and Psych., 6:509-528, 1921.
3. Dubois: Am. Jour. Obst., 74:1074, 1916.
4. Oblitsky and Kligler: Jour. Exper. Med., 31:19, Jan., 1920.
5. Hunt, E. L.: Boston Med. and Surg. Jour., 174: 178, June 1, 1916.
6. Walker: Clin. Soc. Trans., London, 38:80.
7. Hunt, E. L.: Boston Med. and Surg. Jour., 174:788.
8. Gordinier, Herman C.: Jour. of Nerv. and Ment. Dis., 41:640, Oct., 1914.
9. Stopford, J. S. B.: Lancet, p. 1172, June 5, 1915.
10. Waldman, David P.: J. A. M. A., 85:1612-1613, Nov. 21, 1925.
11. Kurlander, J. J.: J. A. M. A., p. 271, July 26, 1924.
12. Hassin, G. B., and Favill, J.: Jour. Nerv. Ment. Dis., 62:33, 1925.
13. Etienne, G.: Bulletin de l'Academic de Medicine, Paris, 90:97-112, July 24, 1923. Abstract, J. A. M. A.
14. Slengalewitz: Comptes Rendus de la Societe de Biologic, Paris, p. 304. Abstract, J. A. M. A., 81: 1239, Oct. 6, 1923.
15. Hennebery, R.: Klinische Wochens, Berlin, p. 970. Abstract, J. A. M. A., 82:1152, April 5, 1924.
16. Etienne, G.: Bulletins de la Societe Medical des Hopitaux, Paris, p. 662. J. A. M. A., May, 1925.
17. Moreno, M.: Revista de la Asoc. Medica Argentina, Buenos Aires, p. 138. Abstract, J. A. M. A.
18. Montgomery, J. C., and Cole, W. C. C.: J. A. M. A., 85:890-894, Sept. 19, 1925.
19. Hunt, E. L., and Cornwall, L. H.: J. A. M. A., 85:186-189, July 18, 1925.
20. Aycock, Lloyd, and Eaton, Paul: Am. Jour. Hygiene, 5:733-741, Nov., 1925.
21. Aycock, Lloyd, and Eaton, Paul: Am. Jour. Hygiene, 5:724-731, Nov., 1925.
22. Thompson, Theodore: Lancet, 1:1031-1034, May 27, 1922.
23. Bessau, Rosenbaum: Leichtentritt-Monatsch. f. Kinderh, Berlin, 22:33, Oct., 1921.
24. Watson, Chalmers: Trans. Medico-Chirurg. Soc., Edinburgh, p. 194, Nov. 5, 1924.

DISCUSSION (Abstract)

Dr. W. A. Smith, Atlanta, Ga.—The cases reported by Dr. Turner are extremely interesting, first because the myelitis was of a limited type, a poliomyelitis, and second, because the patients recovered completely, a thing we seldom see.

The etiology of myelitis is often very difficult to find. Myelitis may complicate any of the acute infectious diseases, although I think it is rather unusual for it to occur in lobar pneumonia, as in one of Dr. Turner's cases. It sometimes occurs after the administration of serums and antitoxins, particularly the Pasteur treatment for rabies. Occasionally it seems due to a focus of infection, and improvement will occur after removal of the focus, such as abscessed teeth. Often a most careful history and examination will not reveal a definite etiologic factor.

The Queckenstedt test, as Dr. Turner mentioned, should be employed in every case. Recently I saw a boy of ten years who suddenly developed high fever, and the picture of a complete transverse myelitis in the mid-dorsal region, with a total sensory and motor paralysis below. The picture was almost typical of infectious transverse myelitis. However, the Queckenstedt test showed a complete spinal block, and a laminectomy by Dr. Dowman showed the presence of an extra-dural abscess in the mid-dorsal region. The boy is now recovering.

The diagnosis of myelitis is often difficult. Spinal cord tumors of various kinds may manifest themselves in an acute manner. Softening of the cord from thrombosis and embolism may simulate a myelitis. I always hesitate to make a diagnosis of acute myelitis until we have excluded so far as possible every other spinal disease. The treatment of myelitis is rather discouraging.

Dr. C. S. Holbrook, New Orleans, La.—We should keep in mind infectious encephalomyelitis. There are cases that we have thought of as encephalitis lethargica, but in the absence of the lethargic condition they cannot be proved until the spinal cord is involved.

Dr. Turner (closing).—Where the diagnosis is doubtful, the case should be called poliomyelitis. We should hesitate to make a diagnosis of toxic myelitis. The usual history of an acute toxic myelitis is that it is progressive and incurable. It was only after studying these cases and trying to rule out everything else that I classified them as acute toxic myelitis.

Myelitis and encephalitis are nearly always associated with meningitis and with chronic myelitic abscesses. The cell count and albumin content seemed to me to rule out encephalitis.

TULARAEMIA: REPORT OF TWO CASES

By C. W. HARPER, M.D.,
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Case 1.—R. E. H., a white farmer, age 45, in the latter part of February, 1927, noticed three small pustules on the right first finger which he opened with a knife used in dressing wild rabbits the day before. Three days later he developed a severe headache and pain in the back and limbs. The next day he had a chill, fever and sweats which continued about ten days. Two days after the appearance of the fever, his right first finger was badly swollen but only slightly painful, the pustules had ulcerated and a thin purulent fluid could be expressed. At about this time a small lump appeared on the mid-forearm, a larger one on the mid-arm and a mass in the axilla, all very tender and painful. These glands were later incised and revealed thick creamy pus. Several small pustules appeared on the back and chest. He lost twenty pounds and was unable to work for six weeks. His blood sent to the Hygiene Laboratory, Washington, agglutinated *Bacterium tularense* in dilution of 1:1280.

Case 2.—Mrs. J. H., a white housewife, age 46, about March 1, 1927, five days after killing and tearing up wild rabbit in her garden (this was done to keep other rabbits out), developed headache, pain in the back and limbs and some temperature and much nausea and vomiting. The latter was aggravated by the thought of a rabbit before the probable connection between the rabbit and her illness was suggested. On the right thumb two scratches which had been present for some days became inflamed and ulcerated, causing but little pain. Next day, on the right arm, a red streak with several lumps along its course and in the axilla appeared, all tender and painful. Two weeks later these glands were incised and revealed thick pus. Recovery has been slow. The patient is very weak and nervous with soreness and stiffness of muscles and joints of back and limbs, seven weeks after the onset of symptoms. Her blood sent to the Hygienic Laboratory, Washington, agglutinated *Bacterium tularense* in dilution of 1:320.

Symposium on Malaria

THE PLACE OF MALARIA AS A HEALTH PROBLEM*

By HUGH S. CUMMING, M.D.,
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In addressing a body like the National Malaria Committee, I realize fully the privilege which I enjoy, the opportunity which is offered and the responsibility which is implied. I am aware that the membership of this Committee includes persons of very diverse outlook, but all united in the common purpose of getting rid of malaria. It has become increasingly evident that if this purpose is to be achieved, and I believe that this is only a matter of time, the services of people of many different viewpoints must be requisitioned. We shall need the zeal of the altruist, the business sense of the man of affairs, the foresight of the statesman, the researches of a whole category of scientists, the hard work of health officers and other administrators, and the intelligent support of the public if we are to reach our goal within a reasonable minimum of time, and without undue waste of effort and resources.

It is impossible in dealing with so complicated a subject for any one person to make a strong or a well-informed appeal to all of the interests involved. In fact, I feel that even a comprehensive confession of ignorance concerning many of the details would be a considerable undertaking. I shall, therefore, try to stick to my last, and discuss malaria from the standpoint of one who, on account of the nature of his duties, is expected to preserve a perspective view, if not a detailed picture, of the diseases and conditions which form the composite problem of public health.

Malaria, of course, means different things to different peoples, according to their environment. In its most virulent and concentrated prevalence, it means literally the impossibility of continued or permanent human occupation of a territory. In a milder concentration, it has the perhaps even more disastrous effect of permitting human existence while precluding the possibility of human health or happiness. In the forms and prevalence which we customarily encounter in the United States at the present time, malaria seldom presents these extreme menaces to the human race. It permits some of the people to be in comparatively good health most of the time, while crippling many others for much of the time, its cultural effect being to hinder concerted progressive effort on the part of populations, and to prevent their participating in the movement of racial advancement which should be their birthright. One of the most important activities in this forward movement is public health. It is the dictum of students of community health programs that these should be comprehensive, well-rounded out; that none of the recognized effective measures should be ignored. It is further maintained that a lop-sided health program which concentrates upon one activity and ignores others is in its last effect worse than none, chiefly for reasons of mass psychology and public economics. But where, I should like to ask, can you find a community where malaria is a serious factor, in which a locally supported well-rounded health program is possible? If such exist, they must enjoy unusual economic freedom. In general, I think the statement is true that a seriously malaria-ridden population is incapable, unaided, of maintaining a well-balanced health program. The obvious indication is to get rid of the malaria first, put the community on a par with others which fortunately do not suffer this handicap, and then proceed with normal development in affairs of health and of economic and cultural development.

It was not my purpose in this discussion to make odious comparisons between malaria and other diseases which claim our attention. I do not intend to decide which is the worst, malaria or heart disease, tuberculosis, cancer or pneumonia. In addition to the opinion which I have already expressed, to the effect that malaria, where it seriously prevails, must be effectually combated before we can expect much progress against the multitude of other health problems, I have indeed but two comparisons to make. One of these is positive. We already know how to prevent malaria much better than we know how to prevent the other major infections which continue insistently to claim attention. This can

*Read before the National Malaria Committee (Conference on Malaria), meeting conjointly with Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

only now be said in this day when plague, small pox, cholera, yellow fever, typhus and typhoid fever have become practically preventable.

The eradication of malaria is now only a matter of refinements in economy, the question of how to make effective measures cheap enough for local adoption and maintenance. All the more reason that we should make a clean job of an undertaking so nearly completed. The other comparison I must put in the form of a question. Is there not some evidence which might lead us to expect something in the nature of a Mills-Reincke phenomenon as one result of the elimination of malaria? The mechanism need not for the present detain us, whether this result is to be predicted on the basis of increased bodily resistance to other infections, or through the dispelling of ignorance and the alleviation of poverty. But is there not evidence in fact that the general health of populations improves after the conquest of malaria?

I am quite aware that in saying "get rid of malaria" I am proposing a difficult accomplishment. Past successes, however, justify the prediction that means will be found of solving the remaining problems. We look to activities such as this Association is interested in, activities of organization, of coordination, of research and of training, to provide the ways and means of ridding us of this obstacle, this stumbling block to progress in other health interests, and we know that we do not look in vain.

I shall listen with great interest to your expert discussions of the technic of your subject. Such questions as the following come to the attention of even the casual student:

"Is it the mosquito in the pool or the mosquito in the house that we are after?" "Is quinine ever useful in the control of malaria, and if so when and how?" "What do we actually know about clinical malaria?" "What species of mosquitoes are practically significant?" "Can the problem of the pest mosquito and that of the disease-carrying mosquito be practically separated?" "Under what conditions may a population rid itself of malaria and when is outside aid necessary?"

We know of various sections in different parts of the world from which malaria has disappeared despite the fact that conditions have apparently remained the same, the population has not changed in character and malaria-bearing mosquitoes persist. I recall that Sir William Osler alluded to this phenomenon with particular reference to large areas in the province of Ontario, which he had known as a boy. I recall that Dr. Hackett of the International Health Board told me that he has run across districts in Italy in which every condition favorable to the propagation of malaria existed and to which infection was being constantly brought by people from the provinces and yet the disease did not take a foothold. These are problems well worthy of our continued and serious study.

I should like to carry away the answers to these and other questions in my pocket, but failing this, I know that my attendance here will bring me inspiration and useful information, as is bound to be the case where earnest and able people deliberate under the guidance of science.

DISCUSSION (Abstract)

Dr. Frederick L. Hoffman, Wellesley Hills, Mass.—It seems to me that the most important aspect of the malaria problem in this country concerns the detecting of persistent centers of the disease, and precise delineation of the most intensely infected areas. Information of this nature should be presented annually at our meetings to draw the attention of the public to the record that requires to be corrected. I am not familiar with present day conditions in southeastern Missouri or with the improvements that have been made in the Yazoo Delta. It would make a most useful contribution to our knowledge if some one annually would collect the mortality data for specific sections, so that it may be clearly indicated where the black spots are on our map that remain to me eliminated. The communities concerned may be relied upon to correct matters, if they are aware that the infection is generally known.

Dr. S. W. Welch, Montgomery, Ala.—Dr. Hoffman's suggestion is very opportune indeed. Some years ago Dr. Maxcy of the United States Public Health Service was assigned to work with the State Board of Health of Alabama and he made a map of the United States showing where the malaria existed. That map has not been revised. There are many places in the Southern states now where there is not so much malaria as there was at that time. A study of the question at least every two years, since situations do not change by year as a rule, and making of the map by some member of the Service would be a most valuable addition to our knowledge of the progress we are making in malaria control. A number of places "black" on the map for Alabama at the time that the map was made are not so now. We have made progress through the aid of the Service and the International Health Board. The question of determination of the areas in which malaria exists is one of the first steps in its control. But it is strange that after we know where the malaria is and how to control it, it stays with us so long.

Mr. J. A. LePrince, Memphis, Tenn.—The Surgeon General called attention in his paper to the fact that malaria campaigns have been the means of bringing into existence one-third of the full-time health units recently installed in thirteen states, which is of decided importance.

Dr. A. H. Hayden, Columbia, S. C.—Treatment of malaria by x-radiation of the spleen, followed by cure when all other treatment had failed was reported some time ago and struck me very forcibly. I should like to

ask whether any of you has had experience with this method.

Dr. C. W. Garrison, Little Rock, Ark.—I cannot say like Dr. Welch that we have cleared up our black spots in Arkansas. It seems we have cleared up to some extent the light spots.

The publications sent out on malaria control from various sources almost all end by saying malaria can be controlled at a very small cost. We should bring the people of the South to the realization of the fact that the problem is a big one, that malaria is prevalent and requires the combined resources of all to get rid of it. We can control malaria at a minimum cost in certain selected areas, but when we strike the black spots, it takes money, and it is a big and serious problem. It requires a great deal of money to combat it on a large scale as has been done by the Department of Health of Alabama.

PROVISIONAL OUTLINE FOR FUNDAMENTAL DATA COLLECTED IN A MALARIA SURVEY*

By MARK F. BOYD, M.D.,**
Edenton, N. C.

The number of malaria surveys that have been made in the United States is, in proportion to the attention that has been given to malaria control operations, disappointingly small. In view of this disparity, neither the indications for or the results achieved by many control programs can be formulated. Furthermore, this inattention to surveys has let slip many excellent opportunities for the collection of data that will elucidate many of the phenomena of malaria epidemiology in the United States.

The value of the surveys accomplished has been diminished because of the dissimilarity in the investigational procedure followed by different surveyors. Any given procedure followed in consecutive years in any one locality would doubtless afford a fair indication of the trend of malaria incidence in that locality. On the other hand, the diversity of practice prevents us from making safe and reliable comparisons of the degree of endemicity prevailing in different areas, a difficulty which we believe could be largely eliminated if the different surveyors would follow a uniform procedure.

In view of this situation, to attempt to outline provisionally what should constitute the basic data to be gathered in an investigation of this character, and the analyses to which it should be subjected in order to elucidate the epidemiological situation prevailing, appears a worthwhile undertaking. The provisional outline herewith presented is submitted with the hope that the attention of malariologists will be attracted to the situation, and that through the agency of this Committee an opportunity may be provided for the development of an outline that will meet with general approval and consequently be widely adopted.

Reconnaissances and Surveys.—These differ in scope and the intensity of the investigation.

(1) *Reconnaissances.*—By these are meant rapid investigations covering broad geographical areas made to define the limits of the distribution of malaria, but without undertaking to determine the character of the malaria problem in any part of the general area. Their purpose is adequately fulfilled by the examination of children for splenomegaly. They can be satisfactorily accomplished at any season of the year. The observations may be made wherever people are congregated (schools), while the data may be handled similarly to the data of surveys.

(2) *Surveys.*—These are intensive investigations carried out in circumscribed areas known to be malarious, to define the character of a malaria problem preliminary to the preparation of a control project. The scope of the survey should include an adequate investigation of anophelines. The fundamental facts to be elicited by the inquiry relating to the incidence of the disease are the following:

(1) The local geographical distribution of malaria.
(2) The degree of endemicity usually prevailing.
(3) The extent of transmission (usual endemic conditions or extraordinary epidemic conditions) which prevails, or prevailed, in the most recent season.

These facts cannot be altogether directly elicited, but are indirectly inferred from the data collected. The data required are objective rather than subjective in character. Hence the latter, such as fever histories, are subordinate and may be omitted without an essential sacrifice. The data for a survey should be collected by a house-to-house canvass.

(3) *Sampling.*—Since observations will be made on a sample taken at random from the entire area, the question of what constitutes an adequate and representative sample must be given careful consideration. The surveyor will require the data of the most recent census to

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**International Health Board.

learn the total population and its racial distribution in the area. Initial plans should be made to examine at least one-tenth of the total population, appropriately distributed according to age, and the results should be tentatively observed and compared with the table of probable error given by Pearl ("Biometry and Vital Statistics"). If the probable error is high, as may be expected with initial results of 50 per cent positives, the sample should be increased until the probable error is diminished to a satisfactory figure.

If reliable census figures are not available, the surveyor will be compelled either to make his own enumeration, or an estimate of the population, preferably on the number of occupied houses.

(4) *Mapping.*—A fairly accurate map of the area on which all data can be localized is indispensable. If accurate maps are not available, they may be constructed by the surveyor, following the directions given by Hulse (*American Journal of Public Health*). The area should be conveniently subdivided so that comparisons of local intensity may be made.

(5) *Field Work.*—This consists in the examination of the individuals that compose the sample. Examinations consist in determining the existence of splenomegaly and its degree, and the collection of a blood smear, together with the necessary identificatory data. The individuals should be selected for the sample without regard to a history of malaria. It is essential that the blood and spleen data be simultaneously gathered from the same individuals. This is not done with the idea of using one to corroborate the other, but in view of the fact that they are complementary procedures. The essential data are the following:

(1) Name
(2) Age
(3) Sex
(4) Race
(5) Place of residence
(6) Length of residence
(7) Size of spleen
(8) Results of blood examination

In accordance with the exigencies of proper sampling, individuals of all ages, all races and both sexes should be examined in the course of a survey. In the course of a reconnaissance limited to school children, the age groups are necessarily limited.

The place of residence should be accurately fixed on the map. The dwellings occupied by the persons examined should be classified according to the degree of obstacles they afford to the entrance of mosquitoes.

(a) Spleen examinations should be made with the subject recumbent, the legs flexed, and splenic enlargement determined by palpation of the abdomen. Palpation should be accomplished by as delicate a touch as possible. Spleen sizes may be classified as follows:

(0) Not palpable.
(P.0.1) Palpable only on deep inspiration.
(1) Enlarged, extending to the costal margin.
(2) Enlarged, margin somewhere between the costal margin and a point half way to the umbilicus.
(3) Enlarged, margin somewhere between the lower limit of the preceding class and the umbilicus.
(4) Enlarged, extending below the umbilicus.

It is felt that attempts to employ fewer groups, or to apply fixed units of measurement, will, at present, not give desirable results.

(b) *Blood Examinations.*—The blood specimen shall be taken from the lobe of the ear after the first two or five drops exuding have been discarded. Thin or thick smears, or if possible both, should be made. Thin smears are examined routinely 15 minutes before reporting as negative, and thick smears are to be examined for five minutes. The method of staining is optional, providing the smears are well stained according to the technic employed. The smears collected should be protected from the ravages of flies and other insects, and stained as soon as possible. Specific distinction should be made between the various species of parasites, both as trophozoites and gametocytes. If the examiner deems advisable, *P. vivax* and *P. malariae* may be reported together as "large parasites" where thick films are employed. Delicate rings with several chromation dots shall be classified as *P. falciparum.*

(6) *Minimal Analyses.*—The data should be handled in the following groups:

(a) Race.
(b) Age, according to the following groups:
Under 1 year of age.
From 1- 4 years of age.
From 5- 9 years of age.
From 10-14 years of age.
From 15-19 years of age.
From 20-39 years of age.
40 and above.

On the above basis, the following minimal analyses are to be presented:

(a) The actual or estimated population.
(b) The actual number of individuals examined.
(c) The actual number of persons with different degrees of splenomegaly and the specific spleen rates for each group.

(d) The actual numbers of persons found harboring *P. falciparum*, together with the specific rates for each group.

(e) The actual numbers of persons found harboring *P. vivax*, together with the specific rates for each group.

(f) The actual numbers and rates for *P. malariae* except that where distinction from *vivax* is not made they shall be classified as "large parasites."

(g) The actual numbers of, and per cent of those examined, showing positive evidence of malaria.

(h) For each of the local subdivisions there should be given, for all below 15 years of age and for all above 15 years of age, as well as for all examined: (1) the spleen rate; (2) the *falciparum* rate, and (3) the *vivax* or large parasite rate.

(i) Separate tables should be presented giving the foregoing information presented according to length of residence as follows: (1) those under one year of residence (including newborn); (2) those from one to two years of residence, and (3) those of three or more years' residence.

Further analyses may be made as the ingenuity of the surveyor may suggest, but the report should not omit any of the foregoing. Data regarding subjective evidence, such as clinical histories or the consumption of cinchona derivatives, should be regarded as supplemental.

The spleen and parasite rates among people living in different types of houses should also be presented.

(7) *Anopheline Surveys.*—These are a coordinate part of an adequate malaria survey. They should be made in the season most favorable to anopheline propagation. They should be expected to yield the following minimal information.

(a) The determination of the local species and of their relative abundance.

(b) The determination of the local anopheline vectors.

(c) The determination of the local production areas of the vectors.

(8) *The Local Species.*—Collections of both larvae and adults should be made in all situations, the searcher being uninfluenced by any preconceived notions. Captures of adults may be both diurnal and nocturnal in character. The specimens should be specifically identified, and the results by species considered according to:

(a) Type of breeding place.

(b) Type of shelter.

(c) Season.

(d) Density of individuals encountered in different situations.

All data should be geographically considered.

(9) *Local Vectors.*—The actual importance of the different species in the propagation of malaria can best be determined by the dissection of wild caught mosquitoes and their examination for the detection of malaria parasites. Specimens for dissection should be secured from areas where malaria is prevalent. The examination should include both stomach and glands, while the results should be considered from the standpoint of successful dissections of these organs. Inspection of the salivary glands should be considered the criterion necessary to implicate a species. The series dissected must be sufficiently extensive to give reliable results.

10. *Local Production Areas.*—Much information bearing on this point will be collected in the course of the determination of the local species. The need is rather for secure negative than positive data.

(11) *The Relation of the Malaria and Anopheline Surveys.*—The reliability of the conclusions deduced from the two surveys may be judged by the extent to which they are mutually corroborative. Especial consideration should be given to:

(a) The relation of the seasonal distribution of the species incriminated as the vector to the seasonal distribution of malaria.

(b) The relation between the local intensity of malaria and the location of the production areas of the incriminated anopheline.

(12) *The Economic Situation.*—The general economic condition of the area concerned may be expected to have a profound effect upon the nutrition and well-being of its occupants, which must be recognized as important though ill-defined factors affecting the malaria problem. It does not seem feasible, in view of our indefinite knowledge of their nature, to undertake to recommend routine procedures in the study of these factors, yet nevertheless they cannot be ignored in the investigation.

While adequate observations along the foregoing lines may be expected to yield sufficient information to make an epidemiological diagnosis, yet the surveyor must remember that the ulterior purpose of his work is to afford relief from an intolerable situation; in other words, to afford a basis on which epidemiological treatment may be prescribed.

DISCUSSION (Abstract)

Dr. M. A. Barber, Greenwood, Miss.—We cannot properly study any change in the amount of malaria in a community unless we have adequate data on the earlier and later conditions existing there. To illustrate, a community in the tropics showed a marked diminution

in malaria following extensive drainage. During the period when malaria was abundant, extensive public works, attended by an influx of laborers, were being carried on. At the time of my residence in the community the public works had been finished and the town had taken on the character of a settled community. Much of the drainage had been completed, but anopheles, of a species known to be vectors of malaria, were still present in considerable numbers. Lacking data as to the numbers of anopheles before and after the ditching, we are left in doubt as to whether the bulk of the change in malaria prevalence was due to the conscious antimalaria work or to the change in the character of the community.

The details of the plan proposed by Dr. Boyd have still to be worked out. A "standard" method with too many requirements may defeat its own aim by encouraging the investigator to attempt more than he can do or have done accurately. Time and means for an ideal survey are often lacking, but, in any case, some dependable measurement of the malaria parasite rate and of the prevalence of adult anopheles is essential.

Mr. J. A. LePrince, U. S. P. H. S., Memphis, Tenn.—The reconnaissance surveys already made in our country were useful in locating centers of high malaria prevalence and in determining possibilities of control campaigns in the local areas visited.

Malaria surveys of an intensive nature along special lines have been made by Barber, Mayne and Maxcy. The British have done much more intensive survey work on a large scale than we have, but their work has not been as closely confined to malaria survey studies leading to the determination or devising of new, better, cheaper and quicker control measures as have the investigations of Americans.

Dr. Boyd brings out the fact that more uniform detail survey studies should be made, and I hope in that connection the questions of malaria carriers, of topographic changes, minor climatic variations in cycles of time, and variations of food values of anopheles and matters related thereto will be given due consideration.

In connection with mapping, the surveys could be expedited if soil survey maps were available for all counties in the malaria belt. These maps show the location of all homes and water courses, and would be available if the general public demand for them were increased.

In connection with anopheline surveys, I desire to urge the wider use of the anopheles traps for houses. At Panama we used double flare traps as a practical control measure, and they can be used in malaria surveys to make it easy to determine the percentage of anophelines entering houses that are infected and to furnish other data.

The study of type of shelter is a very important subject about which but little specific knowledge is available. There are strong indications that at times anopheles prefer man-made shelters to natural ones, but we have not yet capitalized this fact as an important potential control measure as we should do.

Many investigators refer in a very vague way to economic conditions as an important item that affects the malaria problem and the malaria rate, I mean, aside from the screening of the home. Can the existence of high malaria prevalence and its relation to local economic conditions be so specifically defined by malariologists that John Smith can understand what the statements mean? Thousands of pages of purely imaginative literature relative to conditions that spread disease have been given out in the past.

If the majority of the people who go into, or live in malaria districts were poor, and we gave them double their present income what would they do that would decrease malaria prevalence?

Dr. W. L. Holt, Hot Springs, Ark.—I should like to ask Dr. Boyd how he makes his spleen examinations of school children. Can this be done in the rural schools by laying the children down on a table?

Dr. Boyd (closing).—Our examinations of school children for splenomegaly are limited to boys, and are made with the child in a recumbent position.

I have nothing further to add, except to express a hope that a subcommittee will be formed to consider the procedures to be followed in making malaria surveys, and will succeed in developing an outline that will be generally accepted and adopted.

USE OF WASTE OIL AS A LARVACIDE*

By W. A. HARDENBERGH,**
Birmingham, Ala.

When early in 1926 the Department of Health of Birmingham decided to put on an anti-mosquito campaign, we were faced with the necessity of utmost economy. Our preliminary plan called for an expenditure not to exceed $6,000 maximum, while it was the intention to limit this expenditure to $5,000 if possible. For a city of 225,000 population, covering 50 square miles, or 30,000 acres, this meant economy to a considerable degree.

Our estimate called for the use of 12,000 gallons of oil for an average year, with a 20 per cent leeway over or under, depending on the weather. As a matter of fact, it was a very wet summer, and we used almost exactly 14,000 gallons. At the market price of oil in Birmingham, 10 to 14 cents per gallon depending upon the quality, the purchase of oil would here made a very serious cut in our available money. I heard that Mr. Stromquist in Memphis had been using waste oil, so I visited him and as a result we decided to use waste motor oil.

The details of how we collected it are of little interest. In few places will there be any real difficulty in obtaining all that is needed for the work if there is proper management and planning. We accumulated a small reserve early in the spring and thereafter had no worries on

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**Sanitary Engineer, Department of Health.

the matter, due largely to the services of the best oiling foreman I have ever seen, a former inspector of the department who was transferred temporarily to this work. We were always stocked with 3,000 gallons or more on hand and closed the season some 2,800 gallons ahead.

In the early part of the summer we had little difficulty in killing with the oil. It did not spread any too well, but as it cost us very little we put it on thick, and got by pretty well until July, when two garbage dumps near the center of the City started very heavy production. Both these dumps caught on fire, and were flooded with water. This started trouble. Thereafter the dumps were on fire off and on for two months and hose lines were left in place on them and operated continuously. Very foul water stood in pools and puddles on and around these dumps. Culex throve in all these pools. We flooded the dumps with oil with very little result. For some reason the oil which worked fairly well in clear water had almost no larvacidal power in the black, heavily fouled water. In other places we had much the same experience. In storm sewer outlets (which by the way gave us much trouble) where the water was clear, our oil would kill in four to eight hours about 90 per cent of the larvae and all tumblers. In dirty water, the action was much less satisfactory. I kept wigglers from a storm sewer outlet in a large flask in my office for two weeks, with a heavy coating of our best waste oil over them. Few hatched out, but the oil did not appear to interfere with them in any other way.

Following this, we purchased some kerosene and added it to the waste oil in proportion of 25 to 50 per cent. Even this did not work satisfactorily on heavily polluted water, though it was an improvement over the straight waste oil. We also used various compounds, as creolin, cresote, and by-product wastes, having in mind something that would cut the oil, make it spread and add to its killing power.

We happened to have on hand some Kresol Dip No. 1 that we had purchased for various purposes. Noting how rapidly it spread over the surface of the water when applied in a thin spray, our foreman, Mr. I. F. Givens, tried mixing it with the oil. The result was extremely satisfactory. The waste motor oil, when charged with Kresol Dip No. 1 in the proportion of one pint of dip to 4.5 gallons of oil, spreads very rapidly and kills all larvae and tumblers in ten to twenty-five minutes in either clear or dirty water. One effect of the Kresol mixture is to destroy or lessen the surface tension of the water, thus causing the oil to spread rapidly, and, more important, making it flow up and around grass stems and debris of all sorts. When this mixture is used, there is no trouble about getting killing results back to the very edge of the pools, even when they are fringed heavily with grass.

With the oil we were using, the one pint to 4.5 gallon proportion worked very well. A greater percentage of Kresol did not improve matters much. With other oils a greater or less percentage may be best. The least that will give results should be used.

We mixed the Kresol in the sprayer as needed, and used it only when we found larvae. With our work stretched out as thin as it was, we made a complete round of the City once in 15 days, and oiled everything, whether it was producing or not, because the chances were it would be producing before we could get back again, and we had no reserve to take care of such things. It took good management to use the dip only when needed, but as I have said, our foreman was a most unusual one, and he did it without any trouble.

Oil mixed with Kresol No. 1 did not seem to affect fish or animal life any more than straight oil. It did appear to have somewhat greater effect on weeds and vegetation than oil alone. We found no dead minnows or fish, and had no complaints regarding poisoned animals.

Our bill for kerosene and Kresol Dip for the summer was $76.25. We used about 40 gallons of dip at $1.25 per gallon. We collected nearly 16,000 gallons of oil at a total cost of 2.8 cents a gallon delivered at our headquarters in 50-gallon drums. Our total cost of collecting oil was $426.54, which includes time, labor, foreman and truck expense. The oil and Kresol mixture cost us, as you can figure, approximately 5.75 cents a gallon, and it was far better than any straight oil I have ever used.

Approximately half our money went for oiling work. The 14,000 gallons we put out cost us about 19.5 cents a gallon to distribute, including all items. The expenses of our campaign totalled $5,483. We did not obtain complete control of all mosquitoes, but there was no production from any natural sources. Practically all of our trouble came from artificial breeding places, garbage dumps, barrels, basements holding water (these were worst), buildings under construction, roof gutters, and similar places. This seems to be contrary to the experience at many of the

places where mosquito control campaigns have been carried on.

Our experience with waste motor oil was quite satisfactory, and I should consider its use in any place where it could be obtained. The collection of the oil is a fairly good means of advertising the work. The economy, real or apparent, in the use of this oil as compared to the purchase of unused oil is manifest to all, and tends to please that portion of the populace who feel that boy scouts and volunteer workers are sufficient for any anti-mosquito campaign. In other words, there are few real disadvantages to its use, while there are some real and many plausible reasons for using it.

DISCUSSION (Abstract)

Dr. James A. Hayne, Columbia, S. C.—I would very much hesitate to go into any community in South Carolina and try to get rid of the mosquitoes for five cents an acre. There is not much acreage in Birmingham. It is all skyscrapers. Per capita cost always stands out in my mind as the most valuable index. In Bamburg, a town of 2,100, it cost $30,000 to get rid of malaria, but the malaria is gone. It cost $15 per capita. We had about 90 per cent malaria, but now we have none, and it was worth the money.

Mr. W. G. Stromquist, Memphis, Tenn.—Since 1921 we have developed the system of collecting waste oil in Memphis, so that since 1923 we have purchased no oil for our mosquito work. The oil is put into steel drums at the garages and filling stations, and is kept free from cotton waste and other material so that it needs no special straining. We use 16,000 to 18,000 gallons per season, applying a heavier film than formerly, when our oil was more expensive. The cost of collection, i.e., labor and truck maintenance, is 2.5 to 3.5 cents per gallon.

The cooperation of the Fire Marshal has made the system possible, and placed the Department of Health in a position of doing rather than receiving a favor.

Occasionally we get some thick oil which does not spread well. Next year we plan to try mixing a little gas oil with the waste oil when it is too thick.

Mr. H. G. Tuggle, Memphis, Tenn.—Some of the counties of the North Atlantic States do all of the mosquito control work in the villages and rural sections of the county. County funds are thus used for control of pestiferous mosquitoes. Possibly it is only a question of time before we shall use a similar procedure in the Southern States. So far as I am aware, Shelby County, in western Tennessee, is the only county in the South that is carrying on and paying for Anopheles control measures, by oiling or otherwise treating all Anopheles breeding places near all villages and towns in the rural sections of the county. This work has been done for several years under the direction of the County Commissioner of Health.

In addition to controlling an area of thirty-five square miles surrounding the city limits of Memphis, we oil for Anopheles control at twenty-one villages or small towns in the County. The total County area under intensive control by oiling, ditching, Paris green, and by the use of top minnows, is approximately one hundred and twenty-five square miles. The three villages farthest from headquarters are thirty, twenty-eight and twenty-six miles away.

At present the County owns and operates two auto trucks for transportation of oil and for oiling purposes. Two foremen and two crews (five men to the crew) of laborers are kept busy distributing and applying oil in the controlled areas.

To care for the Anopheles control at the twenty-one villages and towns and the area surrounding the city limits of Memphis, we collected about 55,000 gallons of crude or waste oils and used about 45,000 gallons. This oil cost us 1.6 cents per gallon, or $880, to collect and store, and 7.2 cents per gallon to deliver and place on the water surface in and near the towns and villages.

Several years ago some sick cattle died and the owner got the impression that this was due to the presence of crude oil on their drinking water and took the case to court. If the County had used toxic mixtures in their oil, they would have had to prove it was not poisonous or pay for the cattle. I understand that they had oil troubles at Panama about twenty years ago, and to prevent the oil from being washed away they added to their oil a locally made larvicide equivalent to the cattle dip mentioned by Mr. Hardenbergh. This preparation cost them from twelve to eighteen cents per gallon to make. I have made and used the same larvicide as that used in the Panama Canal Zone and found that it cost me forty-five cents per gallon. In our oiling of sewage-charged streams we mixed 1 per cent of this preparation with our mosquito oil and found it to be efficient in breaking the surface tension and also furnishing the required toxicity to our waste oils for mosquito control.

Possibly we are all familiar more or less with the rapid disappearance of oils from the surface of streams that receive sewage and some other waste products. Dr. Willem Rudolfs, biochemist at the New Jersey Experiment Station, presented a very interesting paper on this subject at the New Jersey Mosquito Extermination Association Meeting held last February in New Brunswick, New Jersey. It seems from his report that the best procedure would be to determine chemically the presence of soluble carbohydrates, and when these are found to use some bactericide or larvicide to overcome the condition produced by the gas in sewage polluted streams.

I am very glad that Mr. Hardenbergh brought out the need of more effective treatment of polluted water, for, though the automobile industry reduces the price of the oil we use, it also causes more families to live out of town to install more septic tanks, to pollute more streams, and thus create more scattered battlefields for the mosquito control forces.

Mr. Hardenbergh's figures indicate that forty-one persons received considerable relief for each dollar spent, or a total cost of about 12.5 cents per family per year. Or it costs two cents per family per month for the pleasure of being able to sit out on the porch on hot nights without continuous slapping. Unquestionably, this means that the work was well planned and supervised.

Dr. L. L. Williams, Jr., Richmond, Va.—The larvacidal toxicity of oil increases with its volatility. To produce larval deaths with pure engine oil a very thick film is necessary, which must remain unbroken for at

least two days. Pure kerosene in summer temperatures in the South kills larvae in twenty minutes or less. As applied from a spray-can, two or three times the lethal dose is applied to any given body of water. Waste crank case oil was first used to minimize this waste. Kerosene was diluted with the waste oil in a fifty-fifty mixture, thus saving half the kerosene.

Mr. Hardenbergh has just told us of his experience early in the season when his waste crank case oil used by itself killed larvae readily but lost its killing power later in the season. In the spring and early summer when the mornings are cool and automobiles hard to start, drivers of machines use the "choke" freely. This floods the cylinders with gasoline much of which leaks by the rings and gets into the crank case. Hence crank case oil collected in cool weather contains a fair proportion of gasoline and makes a rather good larvacide. As the summer grows warmer, this gasoline dilution is for the most part lost and the crank case oil loses its power to kill.

Mr. Hardenbergh gives as his oiling period once every fifteen days. This will be sufficiently frequent during prolonged dry seasons. However, this period will have to be considerably shortened during a rainy summer. When rains fill temporary pools we get certain *Aedes* and *Psorophora*, which breed heavily in temporary puddles. A short water stage is characteristic of these temporary pool breeders and many of them are in the water stage for not over five days. Under these circumstances the fifteen-day oiling period must be reduced to five.

Crank case oil finds its main use as a diluent of the more toxic volatile oils. There is another side to the problem, that is, concentration. It is possible to develop an aerial attack, that is, oil marshes by aeroplane. Under these circumstances the most concentrated toxic agent must be used. Dr. S. S. Cook, M.C., U.S.N., and I carried on a few such experiments late last summer, the results of which seemed to indicate that the procedure is feasible. We put a tank in the after-cockpit of the photographic machine at Quantico, Virginia, ran a two-inch pipe to the rear of the fuselage and allowed the oil to flow freely into the air blast of the propeller just below the rudder of the machine. With the plane flying at heights of fifty and twenty-five feet and at a speed of about seventy miles per hour, the oil was broken up into a beautiful mistlike spray and fell to the earth in a fairly even path about 150 feet wide. However, with the kerosene used and the slow speed of delivery, we found that we were only applying one-sixth of a gallon of oil per acre. That was too small a quantity to kill larvae. We have not as yet determined how much oil will be necessary per acre, but it is probably considerably in excess of this figure, for Griffitts, when applying oil as a mist under heavy air pressure, applied approximately two and a half gallons to the acre, and Mr. Clarkson tells me that in Georgia during the past season on a large impounded water project they applied oil by Griffitts' method and found it necessary to use three gallons per acre.

Dr. John H. Hamilton, Wilmington, N. C.—Crank case oil is variable. Some is effective and some is not, and we have come to the same conclusion in regard to kerosene. Some of the best looking oil is least effective as a larvacide.

Mr. Hardenbergh (closing).—I do not remember that I said five cents per acre or per person. Either is wrong. The cost was about two cents per capita, or fifteen cents per acre, skyscrapers and all. We do not oil skyscrapers but we have a lot of land not covered by skyscrapers. We found certain areas which held water longer than others and soon after we observed these I put a truck in service to take care of them. I am interested in Dr. Williams' explanation of why the oil worked better at one time of the year than at the other. I did not work that out.

MALARIA PROBLEM IN MEXICO*

By FREDERICK L. HOFFMAN,
Wellesley Hills, Mass.

My views regarding the malaria situation in Mexico are based on some recent extended investigations made on the west coast of Mexico from Mazatlan to Ixtlan and on the east coast, chiefly in Vera Cruz, the States of Yucatan and Campeche, and on the Isthmus of Tehuantepec. My general impressions may be summarized in the statement that the malaria problem is now of less significance than in former years, but the disease still prevails to an extent in certain sections and certain localities, regarding which, however, very definite data are at present unavailable. In the course of time this paper will be amplified by official statistics for different states and sections which will afford at least an approximate basis of judgment concerning a situation which unquestionably demands attention.

The guide book of Mexico contains numerous references to localities where health conditions are referred to as dangerous, and invariably chiefly on the basis of the climate. The climate, of course, has very little to do with the matter other than that a warm atmosphere increases parasitic life and the prevalence of mosquitoes. As a further illustration, the Standard Guide to Mexico refers to Campeche as a decidedly undesirable locality. I was in Campeche for several days and learned nothing that was particularly alarming.

Likewise many writers charge Vera Cruz with suffering from an overwhelming pest of mosquitoes. I was in Vera Cruz on two occasions for several days. I slept with open windows and suffered no serious discomfort. I mention these illustrations of the effect of reasoning from past conditions, which are almost without exception in marked contrast to the present situation. Anopheles are widely distributed over Mexico, but no accurate survey has been made. There

*Read before the National Malaria Committee (Conference on Malaria), meeting conjointly with Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

is the utmost need for a number of local surveys, which, however, should be made only by those competent for the purpose.

Another need in Mexico is the proper tabulation and qualified analysis of the local mortality statistics. These are kept in antiquated form, but with reasonable accuracy and completeness, except for the fact that in many localities medical attention is wanting, and the reports represent the guesswork of laymen. Much is called paludism that may or may not have been malaria.

Housing conditions practically everywhere in Mexico on the part of the poor foster malaria infection. There is almost universal neglect of surrounding conditions which give rise to parasitic life. The houses, without screens, are in many cases mere huts, or the crudest kind of habitations.

The neglect of malaria in its early stages is universal. There is, in fact, a great need for much better medical attention throughout Mexico to meet the ordinary needs of the poor population. Treatment is usually by quinine, which is often of an inferior quality. Quinine prophylaxis on a large scale is unknown. In my own case I took 10 grains of quinine a day during my stay in the tropics or sub-tropics, and I did not suffer a single attack of malaria, although I was often confronted with cases in a moribund condition. The prevailing type of fever is not generally known on the basis of strictly scientific investigations. But the prevailing impression is that the type is a mild tertian and more of an ailment than a disease taking a fatal course.

Several physicians have expressed to me the opinion that malaria infections modify the prevailing types of venereal diseases in the direction of mildness and short duration.

The thought has also occurred to me that the prevalence of malaria in the tropical lowlands might possibly be an inhibiting factor in cancer which is extremely rare among the native population.

As yet, as far as I can learn, no efforts have been made in Mexico to apply malaria treatment in cases of general paralysis, which, however, is not very common in the Mexican lowlands. A letter from Dr. Baker in the *British Medical Journal* of October 16 mentions a patient who had malaria of long standing but developed general paralysis in spite of it. Very severe recurrences of malaria in no way hindered the progress of the cerebral condition to a fatal termination.

Sanitary prophylaxis against malaria in Mexico is as yet only in its beginning. Progress is very slow and often extremely difficult. The population is poor and often ignorant, as well as opposed to sanitary improvement. Every state in Mexico has a fairly well equipped sanitary department and the same, of course, is true of the larger cities. The principles of public hygiene are fairly well understood everywhere, and by slow degrees a vast population of an indifferent type is being educated to its advantage.

On the Isthmus of Tehuantepec malaria is not a very common affliction, except in a narrow strip of the country along the coast. In the City of Tehuantepec, unfortunately, most of the death certificates are not filled in by a physician. As far as I could learn, there was only one medical practitioner in the town of 30,000 inhabitants, and he was not held in very high repute.

The larger cities of Mexico have good hospitals, and in practically all of those visited I was shown cases of malaria in different stages of the disease. The widespread occurrence of venereal diseases enormously complicates the situation. The same is also true of hookworm disease. Typhus fever, which was a scourge ten years ago, is gradually diminishing and is no longer a serious consideration in the country as a whole.

Water supplies nearly everywhere are of doubtful quality and in some instances positively dangerous to health and life. On several occasions requests were made of me for the literature of our Public Health Service on malaria prophylaxis. The difficulty, of course, is that most of the physicians who could be most helpful are not familiar with the English language. I feel strongly that the Pan-American Sanitary Bureau should concern itself more extensively with the malaria situation and cooperate more effectively with our National Malaria Committee.

Summarizing these observations, I feel that while the malaria problem in Mexico is probably, next to venereal diseases, the outstanding public health question, the condition nevertheless has decidedly improved in recent years, thanks to the active efforts of a well organized Federal Public Health Service. The local situation, while it is a serious one, is not particularly alarming.

I wish to refer briefly to the "Results of

Laboratory Work on Malaria in England" by Dr. S. P. James, one of the foremost authorities on malaria in the world, recently published by the Health Organization of the League of Nations, and to quote from this report:

"In England, the Government Department which administers the Acts relating to the care of mental patients takes the view that, with regard to the malaria treatment of cases of general paralysis of the insane, there are serious objections to the method of inducing the malarial attacks by the direct inoculation of blood from patient to patient. The official arrangements in this country by which general paralysis and other mental diseases can be treated is an arrangement for giving malaria by the bites of infected mosquitoes instead of by direct blood inoculation."

It seems to be very well worth while to give this statement a wider currency in view of the high authority which stands behind it.

I also quote from Dr. James' report another significant statement to the effect that the result of his recent observations

"indicate how small is the chance that a particular breed of malaria carrying mosquitoes in nature will ever be concerned in transmitting the disease. It is probable that at least 95 per cent of the potential malaria-carrying mosquitoes which emerge from the larvae stage in nature will never play that role which is reserved for a few individuals whose life will be passed in a manner very different from that of the remainder of the brood. This conclusion is forced upon us when we consider how difficult it is, under the most favorable conditions, to bring even a few members of a large brood of mosquitoes to a condition in which they will be successful transmitters of malaria."

He, therefore, concludes:

"that in nature the only mosquitoes which succeed in transmitting malaria are those rare individuals who happen to pass their life in conditions which resemble very closely those which we have found to be essential for the successful transmission of the disease in experimental work. No one who fully appreciates the importance of this conclusion and accepts it as true can fail to regard anti-mosquito measures for dealing with malaria from a point of view. He will at least realize what a great waste of effort is involved in measures directed against one species."

And finally the highly suggestive advice that:

"the secret of a successful control of malaria lies not in the general knowledge that the disease is spread by mosquitoes of a certain kind, but in the particular and exact knowledge of the life history of the few individual mosquitoes which succeed in becoming transmitters of the disease."

I regret that I cannot further enlarge upon the observations of Dr. James, who emphasizes phases of the subject which are generally ignored on the part of those who are concerned with the problem of mosquito control.

I am able to give the following statistics for Vera Cruz, which cover the year 1925. There were 2,661 deaths from all causes, of which 166, or 6.2 per cent, were from malaria. This, of course, is a relatively high rate of incidence, but it must be considered that the medical diagnosis in many cases was probably defective. Still I do not question that malaria was common, even though it may not have been the immediate cause of death. For the male population the rate was 5.5 per cent and for the females 7.1 per cent, which is rather contrary to the usual experience that there is a larger malaria mortality among males. There were 47 deaths from typhoid fever in Vera Cruz.

DISCUSSION (Abstract)

Mr. J. A. LePrince, U.S.P.H.S., Memphis, Tenn.—I believe the malaria prevalence on the coastal lowlands of Mexico has considerable detrimental influence on the commerce between Mexico and the United States, and that the completion of Dr. Hoffman's investigation will show both a high malaria rate and pernicious type of malaria to be present in the coastal plain. The topography, rainfall and climate are suitable to such malaria prevalence, and as late as several years or about 1922, the chief surgeons of the American oil interests operating between Tampico and Papantla proved to me that this was the case. I lived in this oil field area for five months and found our friend *Anopheles quadrimaculatus* common near Tampico. In one place about sixty were found in a dry barrel under a tree in the dry season. Dr. Alfredo Cuaron and Dr. A. Stubbs, of Tampico, will verify my statements relative to malaria prevalence which has played havoc with the labor situation in the past ten years.

To some extent I can understand a relative reduction of pestiferous mosquitoes at Vera Cruz as the American army of temporary occupation about 1915 drained the mosquito-producing places in and adjacent to the City of Vera Cruz. Col. W. D. Wrightson, now at Fort Pierce, Florida, directed that control work.

I do not believe the crudeness of the habitations is any more pronounced in relation to malaria in Mexico than it is in the malaria belt of the United States. In both countries until recent years ideas relative to malaria transmission among the farm population were a hundred years old.

It is probable that the health departments of most of the states of Mexico are doing as little toward malaria elimination as are many of the county health units in the malaria belt of the United States: that is, practically nothing.

Much good can be done, and should be done, as Dr. Hoffman suggests, by the Pan-American Sanitary Bureau, which during the term of office of Surgeon General Cumming has translated into Spanish a number of bulletins of the United States Public Health Service relative to malaria. Unfortunately they have omitted to translate the most important and useful message we Americans could send to Mexico, which is an article published about seven years ago by Surgeon L. D. Fricks in *The Military Surgeon*.

All American field workers would very much like to know what the Mexican Federal Public Health Service

is doing toward malaria control and hope that information will be given when Dr. Hoffman's paper is published.

I have read the report of Dr. James that Dr. Hoffman refers to and desire to state that American malaria field workers reached these same conclusions more than fifteen years ago, and our written reports on this subject show that we were applying these conclusions in a number of ways and places in our daily malaria control operations at that time. The mere fact, as recently pointed out in United States Public Health Service publications, that our county health units could use these measures to advantage, but are afraid to do so, does not mean that all American field workers are asleep on the job and have missed the facts that Dr. James has recently published. If Gorgas had not seen fit to approve these methods, our additional labor turnover and labor inefficiency at Panama would have cost us many times over all that has been paid to date for malaria control in the United States.

If any useful control measures are being ignored by all malaria field investigators in the United States, I desire to ask specifically what they are. The one referred to was originated and developed by Americans as can be proved, and one part of it can be checked at the United States Patent Office, Washington, D. C.

Also Dr. Mayne's work of about 1915-1916 brought out the facts that only a very small percentage of potential American malaria conveying Anopheles (in malaria homes) become infective.

Dr. Victor Heiser, I.H.B., New York, N. Y.—Just as a matter of record, to offset the report of Dr. Hoffman, who stated that while in highly malarial regions during the year he took prophylactic quinine and did not contract the disease, I may say that during the past year I spent much time in highly malarial districts and took no quinine and did not contract malaria.

Dr. James A. Hayne, Columbia, S. C.—I stayed in a highly malarial district in Panama for two years and did not contract the disease. As soon as I reached Monterey I had quite an attack which lasted for three months.

Dr. Hoffman (closing).—I unfortunately could not visit Tampico, but I am familiar with the work of Mr. LePrince and have read his reports. As regards the mosquito question, I am glad he has emphasied the essential facts, although I am not so familiar with the local situation as I should like to be.

With reference to prophylaxis, I can speak only of my own experience. For more than thirty years, I have been traveling through the South and have never had either malaria or yellow fever. I was in New Orleans during the last epidemic, but did not contract the disease, although I did not take any particular precautions. In the light of my recent experiences, particularly in South and Central America, I firmly believe that quinine prophylaxis, taking ten grains a day, is an absolutely sure protection in most cases. At least, it has been wonderfully effective in my own case, for I have been considerably exposed in highly infected localities.

SOME METHODS OF ESTIMATING THE AMOUNT OF MALARIA IN REGIONS OF LOW ENDEMICITY*

By M. A. BARBER,[1]
W. H. W. KOMP,[2]
and
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Greenwood, Miss.

In a region where malaria is not only widespread but severe, as in some portions of the tropics, either the spleen or the parasite rate of a fairly large group of children may measure the malaria rate with enough accuracy for the purpose in hand. Where the disease is comparatively mild, however, and malarial attacks of even infested persons are infrequent, malariometry offers greater difficulties. Such difficulties are found in some communities in the southern United States, where, indeed, it is sometimes a problem to determine whether malaria in measurable amount is present or not.

In our present discussion of the criteria of malaria surveys, we have in mind conditions under which the investigator must often work—limitation of time and means for an ideal survey.

The History Rate.—The value of history records in estimating malaria prevalence is unquestioned; equally certain is the necessity of carefully scrutinizing such records before taking them at any large proportion of their face value. Malaria is notorious for the number and variety of its symptoms. Neither physician nor layman can be much blamed for an occasional mistake in diagnosis, nor is it a wonder that malaria may be made a scapegoat for professional doubt. An attractive scapegoat it is for all, for, to shift our simile to the invertebrata, the blame lies more lightly on the mosquito than on some dietary or other unhygienic indiscretion of our own.

Local physicians may disagree on the elemental question as to the presence or absence of malaria in their communities. Official records based on the reports of these physicians, then,

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2. Associate Sanitary Engineer, United States Public Health Service.
3. Technical Assistant, United States Public Health Service.

can hardly be trustworthy for purposes of estimating the malaria rate in smaller units of population; for large areas the official reports may be more useful.

The error inherent in the history rate is not a constant one. In a community where malaria may be almost extinct the malaria tradition may remain strong. Where the disease is getting a foothold, or where cases migrate to a non-malarious region, its prevalence may be underestimated. Smoke is an indication of fire, but one cannot always judge of the extent of the conflagration by the volume of the smoke. Tradition may outlast a disease as smoke may outlast a fire.

The best course for the investigator is to collect all history material which promises to be of value, then to use these data as a guide to further sources of information, not as a final index of truth. Sometimes a close scrutiny of the character of a group of histories will be of value. Where there is really a good deal of malaria a certain proportion of the cases should show a tertian type of fever, or some one of the less mistakable marks of the disease. It goes without saying that many genuine cases of malaria fail to show anything very typical, but a fair proportion of the histories ought to be more or less characteristic.

Confirmation of at least a proportion of the cases by blood examination for malaria parasites is indispensable.

History reports, then, are of value, especially in delimiting some of the broad regional outlines of present or past malaria, but reports of this character should serve as guide-posts rather than as final authority.

Mortality Records.—These need even more careful scrutiny than morbidity records, especially where the number of fatal cases reported is small and the danger of error consequently large. Certain insurance companies will not pay indemnities in case of death from syphilis or tuberculosis; in such cases a less scrupulous type of physician may substitute the more respectable for the more probable cause of death, or at least give the patient the benefit of the doubt, a benefit which does not accrue to the statistician.

The Spleen Index.—The proportion of children with enlarged spleens, an index of malaria long recognized as invaluable in the tropics, is of undoubted utility everywhere. Where the amount of spleen enlargement is small, however, the examiner should be on his guard in the interpretation of his results. We know that there are other causes of splenomegaly in children than malaria, and we do not know just how long the spleen enlargement may persist after the acute condition of these diseases has subsided. The experience afforded by the examination of a large number of children in a region known to be malaria-free is almost indispensable to the malariologist. Such experience will enable him to establish a standard and be in a position to estimate the significance of a spleen normally palpable or of enlargements due to causes other than malaria.

In all cases the examination should be a most careful and painstaking one, designed to obtain the maximum amount of information from each case.

The Parasite Index—The significance of the parasite index will, of course, vary with the character of the population examined. Where the amount of malaria in a community is presumably very small, we have usually included in our surveys certain selected groups where the presence of malaria is most probable. Such groups are usually obtained through the co-operation of physicians and by house-to-house surveys, and include persons with symptoms suggesting malaria or persons with a recent history of that character. As a corrective of the selected group, we make use of the parasite index of children in actual attendance in schools, an index usually lower than that of children generally in a population, since the seriously ailing children are likely to remain at home. Children more often than adults carry parasites in numbers sufficient for detection, and negro children usually show higher parasite rates than the white.

Where the parasite rate is an important part of the research, we believe it best for the investigator to examine a large proportion of the blood preparations himself, even if it becomes necessary to limit the time devoted to each slide. The investigator has a stake in the accuracy of the results such as a technician can but rarely possess.

The time required for the examination of blood preparations may be reduced by the use of the thick films. With such films carefully prepared and stained an experienced examiner can get over a great deal of ground in a few hours. The time and labor required for an extensive blood parasite survey is not so great as is ordinarily thought, especially for the worker who

can alternate his microscopic work with other activities.

To mention a detail, we should especially emphasize the necessity of rejecting as negative preparations in which there is the least doubt as to the identity of the parasite. The examiner may pass over a real positive now and then by excess of caution, but he will obtain a far more useful standard of comparison than if he commonly includes as positive anything at all doubtful.

The limitations of the parasite index are obvious; many carriers will have too few parasites to be detected by the most careful examination. The repetition of the examination of the same group will sometimes augment the number of positives obtained. MacDonald[1] examined daily for seven days those remaining negative among a group of children in Freetown, Sierra Leone. This intensive method raised the parasite index from 48 to 85 per cent.

During the current year we have examined a certain white rural school five different times, three times during the spring term and twice during the autumn. The number examined at any one time varied from forty to sixty-nine. Five different parasite carriers were found in the course of the five examinations. The highest number found at any one examination was two. Fifteen children were present at all examinations. Only one positive was found among these fifteen; that child was positive twice. A negro rural school was examined three times. Among eleven children present at all examinations, four carriers were found at the first examination and one subsequently. Several of the original positives were again positive on subsequent examinations. In this region where the parasite rate is low the re-examination of a school does not seem to have largely increased the proportion of positives detected.

Whatever the limitations of the parasite index, it affords a most valuable standard of comparison. The examination of the blood discloses the degree of infestation of each carrier, the type of parasite, and not infrequently the amount and character of the anemia present. On the whole, the microscope probably gives more valuable information than any other single means of examination.

Determination of the Sick Rate.—By house-to-house surveys this affords information of the greatest value. In our surveys we search for cases of illness from whatever cause, take blood specimens, and use every available means to determine what proportion of the people are suffering from malaria. We have usually conducted such surveys during midsummer and have often continued them for weeks. It would seem hardly possible that a great amount of malaria could exist in a neighborhood without some evidence of it appearing in these epidemiological cross-sections, especially when this work is supplemented by the cooperation of the physicians practicing in the neighborhood.

The Consumption of Quinine or of Other Fever Remedies.—This has been accepted as a rough sort of criterion of the prevalence in a community of the disease for which these remedies are more often employed. Such data must be judged in the light of the medical customs of the people. We know of a community where the consumption of fever remedies increased materially with the immigration of people from regions reputed to be malarious. But the fact that the sale of snuff increased *pari passu* with that of quinine suggests that we may be dealing with an example of the importation of habit, not of disease.

Malaria Among Bunk-House Laborers.—Occasionally an index of the amount of transmissible malaria in a community is afforded by the importation from relatively malaria-free regions of gangs of temporary labor. Such laborers, usually occupying bunk-houses or other inadequate shelter, are liable to epidemics of malaria, and may give one a valuable, although unwelcome, indication of the number of malaria carriers among the indigenous population. The malaria rate among groups of Mexican cotton pickers imported into the delta region of the Mississippi has given us some idea of the amount of malaria danger in different sections of Leflore County, Mississippi.

It must be remembered that the bulk of malaria in a region does not depend simply on the number of carriers of parasites, but also on the frequency of malaria attacks among such carriers. A method of measurement of malaria, the parasite index for example, may fail to give us the whole number of parasite carriers, yet may afford a valuable index of the total amount of malaria suffered by the population. In Central America we have found among the children of certain plantations parasite rates of 70 or 80

1. MacDonald, G.: Malaria in the Children of Freetown, Sierra Leone. Ann. Trop. Med. and Parasitol., 20:239-262, 1926.

per cent. Among children in the rice-growing regions of southern Louisiana we found parasite indexes of 2 and 3 per cent. It is probable that a larger proportion than 3 per cent of the Louisiana children were infected at some time during the year, but the difference between 3 per cent and 80 per cent may roughly measure the difference in the actual amount of malaria sickness in the two regions. In the tropics groups of children are found who show almost continual illness due to malaria, a condition of things fortunately absent in Louisiana.

SUMMARY

In estimating the amount of malaria in regions where the rate is low, we recommend the use of all criteria practicable within the available limits of time and opportunity. While no single index is satisfactory, the blood-parasite rate is probably the most valuable one, provided it is based on both selected and non-selected groups. The results of the examination for splenomegaly among children should be interpreted with caution, especially where a large proportion of the enlarged spleens is barely palpable. The history rate finds its greatest value as a guide to other sources of information. House-to-house surveys afford a most valuable index of the amount of malaria, and are practically indispensable where the rate is very low. It is advisable that as large a proportion as possible of the data of a survey be obtained by the investigator in person. There is more danger of error through faulty examination by incompetent technicians than through the smallness of the sample.

DISCUSSION (Abstract)

Dr. Mark F. Boyd, Edenton, N. C.—I believe that the policy recommended of dividing the sample taken into one group chosen at random and another deliberately selected leaves great room for error, as the surveyor will have great difficulty in presenting and interpreting his results. It furthermore will complicate comparisons between two different places. I consider random sampling alone the best.

Blood and spleen examinations should never be considered separately. If we are going to utilize both methods of examination, they should be done on the same people. You cannot compare the blood findings from one group with the spleen findings from another group.

Repeated examinations of the blood of the same individual, while undoubtedly increasing the number of positives, also introduces a factor that complicates an interpretation of the results. It is better to know that a single examination may give 10 per cent positives than that 15 per cent positives might be secured if some individuals were re-examined.

I feel that Dr. Barber is unjustly pessimistic on the question of the reliability of technicians. Granting that incompetent or untrustworthy technicians exist, the individual employing a technician should satisfy himself that his technician is both competent and trustworthy. I can affirm that trustworthy individuals exist and that they may be satisfactorily trained. Certainly the time of any surveyor who insists on himself examining the smears he collects will be greatly limited as a result.

Mr. Barber (closing).—A word in regard to the inclusion in malaria surveys of groups selected because of suspicious history or other evidence of malaria. Such groups are useful in preliminary surveys, especially when one is in doubt as to whether malaria exists in a community. In a complete survey we include unselected groups as well and record separately the results of each group. We commonly use children in schools as representative of unselected groups. Where both spleen and blood examinations are made we usually do both at the same time.

There are technicians whom one can trust and we have known of them. Generally, however, we believe there is less error when hundreds of examinations are done by the investigators themselves than when thousands are entrusted to technicians who have little or no scientific stake in the results.

A HOUSE-TO-HOUSE SURVEY OF MALARIA IN THE MISSISSIPPI DELTA, 1926*

By T. B. HAYNE,**
Greenwood, Miss.

A survey was made of malaria in the Mississippi Delta during the period beginning June 9 and ending August 10, 1926. The purpose of the survey was to obtain by direct inspection some information regarding the amount of malaria prevailing among the white and colored renter class on cotton plantations. House-to-house visits were made, persons ill with any diseases sought out, blood specimens were taken of such persons, and every effort was made to determine whether the illness was malaria or not. A summary of the results of the survey follows:

Ninety-five white families, representing five hundred and seventy-nine persons, were visited. Sixteen persons, slightly under 3 per cent of the total, were found ill at the time of the visit. Not one of these sixteen showed malaria parasites in the blood. Forty-eight persons were found who gave a more or less definite history of malaria of recent date. Blood examinations

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were made of these persons also and three carriers of malaria parasites found. About three-fifths of the white people were examined in June, the rest in July and August.

Two hundred and five colored families, representing 1,280 persons, were visited. Forty-six, or about 3.5 per cent, were found ill at the time of the visit. Of the forty-six, only one showed malaria parasites in the blood. In addition, one hundred and forty-one persons were found who gave a more or less definite history of recent malaria. Among these, twelve carriers of malaria parasites were found. About one-third of the colored families were visited in June, the rest in July and August.

Summarizing both races, of the three hundred families representing 1,859 persons, only one sick person was found who showed malaria parasites in the blood. Fifteen parasite carriers among persons apparently well were found, that is about 5 per cent positive among three hundred and two examined, not a high percentage considering the fact that those examined were a highly selected group.

The survey did not disclose, then, a large amount of malaria. Even if half of the number ill had been suffering with malaria the malaria rate would not have been particularly high. Two-fifths of the people were seen in June, a month in which sickness is at a minimum, and about three-fifths in July and August, months when malaria should be evident if it is at all abundant. Up to September 1 the season was normal as regards rainfall and mosquito production.

Of the sixteen positives found, nine were estivo-autumnal, five benign tertian, and two quartan.

A survey of certain economic factors was made at the same time as the malaria survey. The results are summarized in Table 1.

TABLE 1

SUMMARY OF FACTORS INCLUDED IN ECONOMIC SURVEY OF DELTA PLANTATIONS

Number of families visited		302
Condition of Houses—		
Good	65	
Medium	215	
Poor	18	
Unclassified	4	302
Houses with some screening	169	
Houses with bed nets	97	
Houses with no mosquito protection	69	
Houses examined for Anopheles	129	
Number of Anopheles found	357	
Water Supply—		
Artesian	103	
Wells with pumps	178	
Open wells	7	
River	1	
Not classified	13	302
Families having kitchen gardens	286 out of 292	
Families keeping cows	253 out of 283	
Families keeping poultry	283 out of 291	
Families keeping hogs	277 out of 293	
Families having automobiles	117 out of 277	

Noteworthy is the fact that about 56 per cent of houses had some kind of screening. But little over one-third use artesian water, a point worth noting by those who ascribe the bulk of the decrease in malaria to the use of artesian water. Judging by the percentage which have gardens, cows or poultry, it would seem that these families do not wholly lack variety in food. The large percentage of automobiles per family does not necessarily indicate a highly mobile population since many of the automobiles were incapable of locomotion.

FURTHER STUDIES OF THE IMPOUNDED AREA AT GANTT, ALABAMA*†

By W. G. SMILLIE, M.D.,
International Health Board,
New York, N. Y.

The malaria studies of the impounded area at Gantt, Alabama, for the period 1923-1925 have been reported in detail.[1] This paper is a brief report of the continuation of those studies during the malaria season of 1926.

It is not necessary to review the previous report, nor give a history of the Gantt epidemic of malaria and methods used in its control.

During 1926 the methods of study followed were the same as those described in the original report. The area was impounded throughout the malaria season. Clearing had been effected in accordance with state regulations, though in some of the small inlets and bays in the upper area near Simmon's Bridge (see map) the clearing was not perfect. Supplementary control measures were used, consisting of oil spray under pressure from a motor boat. This work was

*Read before the National Malaria Committee (Conference on Malaria) meeting conjointly with Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

†From the Field Training Station, International Health Board, Andalusia, Ala.

1. Smillie, W. G.: Studies of an Epidemic of Malaria at the Gantt Impounded Area, Covington County, Alabama. Am. J. Hyg., Baltimore, 7:46-72, Jan., 1927.

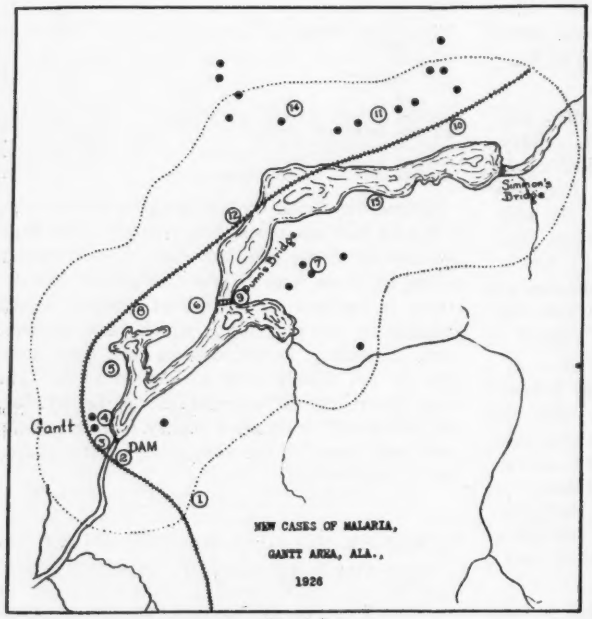

Chart I

Map of the Gantt Impounded Area in Alabama. A dotted line is drawn within a one-mile radius from the shore line of the pond. In 1926 all but three of the cases of malaria occurring in the area were at homes within the limits of this line.

carried out by the company owning the reservoir and results were checked by the county health officer or his assistants.

Regular searches for anopheles larvae were made by the inspector and when they were found the spot was indicated by a white flag. The spray boat then redoubled its efforts in areas where complete control had not been gained. *Anopheles quadrimaculatus* were well controlled in the entire lower half of the pond during the entire season, but control was not complete in one area of the upper half of the pond from June 15 to about July 19. Following the increase of *A. quadrimaculatus* prevalence in this area, there occurred an increase in cases of malaria, the cases being limited in great part to the area of *A. quadrimaculatus* prevalence.

This is well shown in map (Chart I). It will be noted from this map that only three cases occurred near the dam, four near Dunn's Bridge and the remainder on the north side of the pond where *Anopheles quadrimaculatus* control was lost.

The incidence of malaria during the entire epidemic is shown in Chart II. During 1926 there were twenty-one new infections and thirty-six relapses. The reduction in the number of relapses is striking when compared with 1925, and is probably due to intensive quininization of all carriers during the spring months.

The incidence of malaria by months in the upper and lower areas of the pond is shown in Chart III. Superimposed on the malaria graph is a graph showing the prevalence of the three species of anopheles. It will be noted that in the lower area there was a relatively high incidence of *A. crucians* from May to September without a corresponding increase in malaria. In the upper area, however, the increased prevalence of *A. quadrimaculatus* was followed, after a period of about one month, by a definite increase in malaria incidence. This seems to offer additional proof that *A. quadrimaculatus* was the important vector of malaria in the Gantt area, and also that *A. crucians* played little or no part in the distribution of the infection.

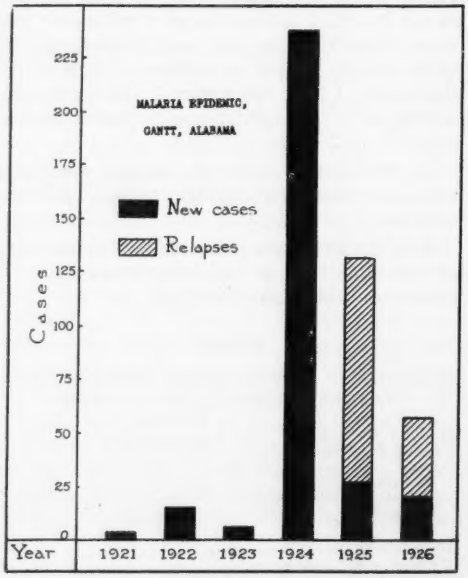

Chart II

Yearly incidence of malaria for the Gantt area from 1921 to 1926, inclusive.

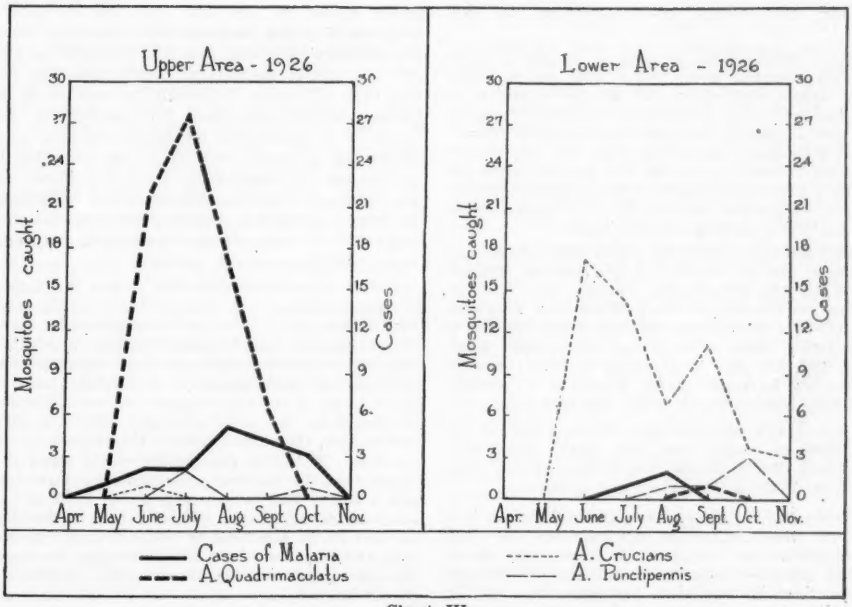

Chart III

Relationship between the incidence of malaria and the incidence of A. quadrimaculatus in the upper half of the Gantt Impounded Area in 1926.

Summary.—Additional data are presented concerning the epidemic of malaria in the impounded area at Gantt, Alabama. *Anopheles quadrimaculatus* control measures were successful except for a short time and in a limited area. The additional information coincides with that obtained in the previous years' studies and confirms those conclusions, namely: that *A. quadrimaculatus* is essentially a pond breeder with a limited flight range of about one mile under usual conditions; that *A. quadrimaculatus* was the vector of malaria in the Gantt area and that when the breeding of this mosquito is checked the disease disappears.

DISCUSSION (Abstract)

Mr. W. G. Stromquist, Memphis, Tenn.—During the past fifteen years the agencies engaged in development of water power in the Atlantic and Gulf States have probably done more in the way of increasing the annual income of a number of counties (as well as increasing state and Federal revenue) than any other business development. They have also brought dozens of new industries into these Southern states, and were it not for the increased business activity that they have created, large numbers of families and merchants in the states in which they operate might not be so well off as they are at the present time.

Not only have these agencies created local, state and Federal wealth, but they also have in most instances voluntarily expended hundreds of thousands of dollars in taking precautions that the man-made changes of topography connected with their projects should not create any potential unhealthful conditions.

In fact, in some instances their activity has been systematically investigated by our constituted health authorities who determined that some projects resulted in decreasing the local malaria prevalence.

This being the case, it is of interest to sanitarians and others to determine to what extent the agencies that are bringing prosperity to sparsely settled rural districts and nearby towns are receiving county and state cooperation and support from constituted health authorities and from such organizations as ours. Unquestionably, the program and objective of the National Malaria Committee, as originally stated in print, was intended to offer suggestive or other cooperation.

Here we have a condition where business executives are carrying on health work; are carrying on malaria control operations on a much larger financial scale than all other anti-malaria activity in our country taken as a whole. Those who are doing the best sanitary work are being attacked and robbed for doing applied sanitation.

They have in a number of instances undertaken a much more thorough malaria control campaign than the requirements of the state board of health called for. Yet they are frequently subject to legal attacks, and are embarrassed and sometimes lose their legal cases because the state departments of health have insufficient data as to malaria prevalence and insufficient funds and machinery to gather data in the localities where the

county and state revenue producing project has been created.

The state health officials of each of the states of the South with potential water power sites are all interested in malaria elimination, and are also interested in having sufficient state and county revenue to enable proper functioning of state and county health departments with adequate trained personnel. So why cannot some action be taken to protect the agencies which are producing a considerable portion of the present income, and which will produce more in the near future as more impounded water projects are developed?

It would appear essential for proper and normal state development that a majority of the business interests of the state, the state health officials, and the malariologists get together on this problem with a view to having full-time health units installed in all counties in the near future where water power will be later developed, so that the past and present status of malaria prevalence will be approximately known in all counties where future impounding of water will take place.

This is a health problem upon which a part of the future status of county and state health department funds depend, and it should receive the attention from the National Malaria Committee that it merits.

Dr. S. W. Welch, Montgomery, Ala.—This has been one of the most interesting developments the State Board of Health has ever had. It relates very clearly the power which an organization has over the financial world, provided its regulations are reasonable. As Dr. Smillie says, these people began their work before we had formulated our regulations. We worked on the regulations for more than two years before they were promulgated. When promulgated, they represented improved standards of control suggested to the State Board of Health by the best authorities in the country. Wherever any of those asked to advise us objected to any procedure, or anything was criticized, it was cut out. The regulations as they stand represent approved methods of control unanimously advised by the best sanitarians in the country.

When the power companies first backed water up without a permit and we demanded that they dewater the area, they refused. We did not give in one inch, and at about the time the trial was to come up they said they were willing to obey the regulations; that we were right and they were wrong, and if we would withdraw the suit they would do anything we asked. This eliminated opposition on the part of people who wanted to impound small areas of water. We have had no more trouble. I simply wish to say to those health officers who have the problem on their hands: stand pat; do not give in one inch.

Mr. J. A. LePrince, U.S.P.H.S., Memphis, Tenn.—It is to be hoped that the representatives of the International Health Board will keep on digging deeper into this imponded water problem and determine some of the important factors that none of us has yet reached, which may compel us to change our method of control of anopheles development in impounded water projects and incidentally develop a more rapid and more economical procedure than we have used in the past.

You will notice that the owners of the lake site attempted to sidestep the problem of clearing the lake basin, and did not remove the cut down brush and trees. It finally cost them about twice what it would have done to complete the clearing before impounding the water. The unit clearing cost in projects completed during the past few years has increased to a serious extent, and unquestionably there is a large field for investigation along that line and also in devising new and better methods of control involving no new risk that will make it possible to omit many of the present clearing operations. For instance, the floatage might be so treated that instead of increasing anopheles production it would serve as an egg collecting agency for the last quadrimaculatus brood that should exist in the vicinity of the lake. We compelled stegomyia crops to destroy themselves twenty years ago, and it is not impossible to make the quadrimaculatus lay their eggs where the larvae cannot survive.

I was very glad to note how closely the flight range of quadrimaculatus at Gantt's Lake corresponds with that determined by previous investigators ten years ago in the northern and southern sections of South Carolina. It would be of interest to determine to what extent the few quadrimaculatus at isolated houses beyond flight range of the lake originate in containers and also to determine the exact character of other places in nature that they come from. This brings up another question. If in the river valley where water is to be impounded, the *Anopheles quadrimaculatus* are relatively scarce before the water is impounded in it, and sources of quadrimaculatus are relatively few, it would probably not be an expensive or difficult matter to trap the eggs and trap the adults for a period of two years before the pond was made and then determine what would happen.

I should very much like to believe that this species radiates out in all directions each night from its source. In investigational work with other anopheles, this was not found to hold true. Apparently further investigation is needed to prove that they do or that they do not always do so.

Dr. Smillie's data seem to indicate that where the anopheles are most numerous there is most malaria, which makes us wish to think that a large number of anopheles is necessary to produce an epidemic. This may be true in an impounded water project, and the epidemic may fail to develop near other places where the same species of anopheles is even more numerous. Is there something about the new impounded water project, or newly opened-up country, that involves uninvestigated factors? Perhaps under certain conditions the infected anopheles have a longer average life, or perhaps a larger percentage of them become infective. The main difference between a pond or lake less than three years old and long established lakes is the amount of floatage on the water surface. What do we know about the influence (direct or indirect) of this floatage in relation to the power of anopheles to transmit malaria? I am glad that Dr. Smillie and his co-workers selected for study a narrow, long lake that is somewhat similar in character (in anopheles production) to the upper quarter of the long narrow inlets of some larger projects. A very important point yet to be investigated is the possibility of devising an entirely new, rapid and economical method of preventing anopheles production in narrow and long (or wind-shaded) inlets of lakes, where plenty of floatage or other protection for anopheles larvae exists. I do not yet believe we have said the last word in fish control methods, nor that the control methods for impounded water projects which we now use will be standard within the next five years. Better and less expensive methods of control are necessary. For the successful and more rapid develop-

ment of the Southern states we must reduce the first costs of power development.

Dr. M. A. Fort, Bainbridge, Ga.—Spring Creek is the boundary line between Decatur County, Georgia, on the east and Seminole County on the west. It probably averages 60 feet wide and six feet deep with considerable current. There is an outcropping of limestone at various places along the valley, and there are limestone springs. The valley varies from a few hundred yards to a mile in width, and is covered with a swamp of gums, pines, cypress and many other trees, and underbrush. Normally there is very little water in the swamp. Out on the hills bordering the valley are a number of farms of very good land.

In 1920 a power company of local capitalists constructed a dam across this creek, backing the water up nearly to Brinson, eight miles above, and making a lake of so much of the valley. There was considerable friction with the natives, who claimed that mosquitoes and malaria were increased. This contention continued until 1925, in January, when the dam was destroyed by a freshet.

In March, 1925, I was asked by the company if there was anything they should do to prevent mosquito breeding while the dam was down. I visited the site and went a considerable distance up the stream, dipping in what holes I found. There were a few quadrimaculatus larvae in some holes which soon dried up. Inquiry at the homes proved that there were no mosquitoes of any kind along the valley during the whole summer. I suggested to the company that as long as there was no dam there would be nothing to control, but there would probably be a different condition when the dam was rebuilt.

About October, 1925, a farmer living near the dam came to me, saying that the mosquitoes were terrific. Upon investigation I found that the dam had been repaired, the water was slowly rising, and the homes were infested with large numbers of quadrimaculati. Hollow trees in the swamp were lined with the mosquitoes, and their larvae were discovered not only near the edges but all over the pond as well. There was much floatage of sticks, chips, bark straw, refuse from burnt-over woods, as well as algae and other floating growth, making ideal conditions for quadrimaculatus breeding.

At once I took this matter up with the power company, urging them to get ready for control before spring. The company changed hands several times, and after each change I renewed my efforts to have them institute control measures, but no control was attempted.

By early summer of 1926 the production of quadrimaculatus was enormous. Garages and stables would show not hundreds but thousands. Homes, both screened and unscreened, showed hundreds, in spite of the daily use of sprays and smudges.

An interesting evidence of how far quadrimaculatus travels in numbers sufficient to be a menace, was shown by a survey. Every house east, west, north and south of the pond within 1.5 miles was heavily supplied with mosquitoes. But at two miles or over none were found, or at most only one or two. As this same condition obtained on every side of the pond, it seems clear that where the production of mosquitoes is large, protection must extend to homes for two miles from the breeding place in south Georgia.

At some time during this year (1926) probably 90 per cent of the people had malaria and 90 per cent of the children examined had palpable spleens. Probably four hundred and fifty people were affected. That results were no worse was due principally to the fact that we furnished them with quinine at cost, and persuaded them to take it constantly instead of chill tonics.

To my mind there was never a clearer demonstration of the transmission of malaria, the danger of uncontrolled impounded water, the agency of the quadrimaculatus than this. Yet a few physicians in the county do not believe that the pond increased malaria. Quadrimaculatus mosquitoes, palpable spleens and acute malaria practically disappeared both up and down the creek, as soon as a distance of two miles was traveled.

Late in the summer of 1926 certain citizens living near the pond entered suit for damages against the company. Before the date for the trial, a meeting of the attorneys and health officials was arranged, and the power company agreed to employ an expert, build a boat, equip it with tank and compression apparatus, and cut lanes through the swamp and brush so that they could spray the entire area at regular intervals. They agreed also to empty the pond the following summer and clear the entire pond basin, leaving only the border to control. Work to this end has begun. It will be difficult to get perfect control until the pond is cleared of all timber and obstructions, and one boat is probably not enough for the work.

The dam is leaking badly, and the water is steadily falling. There is a general opinion that if the dam breaks again, or if other plants of this company are connected, the company will dismantle this plant and thus settle the matter.

Dr. James A. Hayne, Columbia, S. C.—I saw in the paper two weeks ago that Georgia and South Carolina would have a large project in McCormack County. This will take in a large portion of Georgia and a small portion of South Carolina.

Dr. T. H. D. Griffitts, U.S.P.H.S., Biloxi, Miss.—For several years I have investigated the influence of newly impounded waters on malaria incidence. Last year I was in charge of sanitation for a power company which was preparing the area for what was said to be the largest artificial lake in the world, covering 40,000 acres and having an irregular shoreline of 500 miles. The draw-down is 60 feet. In other words, the variation in the water level will be 60 feet. The regulations of the State Board of Health in the State provide, among other things, that all brush, trees and undergrowth which would pierce the surface of the water at low water level shall be cut off at least one foot below the low water level to prevent the collection and anchorage of floatage. In this enormous area, logs and brush were felled and the logs wired down by the use of eight-gage wire anchored to stumps to prevent their floating. This measure does not, in itself, necessarily reduce to any great extent the amount of fine floatage which will arise from the area below the minimum water level. In preparing an area of this kind, it is advisable, after felling the trees and brush, to burn everything that will burn in order to get rid of material that will later constitute fine floatage, for floatage makes the home for *Anopheles quadrimaculatus*. By selecting a dry time and burning the area, the cost and time of tying down will be greatly reduced, and from 50 to 75 per cent or more of floatage material will be eliminated. Workmen can then get through the brush more easily and find the logs that require anchoring.

One other phase of malaria control on impounded

waters is very important. Undoubtedly the land departments of some of the large companies have been able to do much more effective work in malaria prevention than have their medical and surgical departments. I mean by this that the purchasing or leasing of lands in a zone extending from a mile or more outward from the maximum contour and removing the population is much more effective in some cases than state regulation. I have in mind one example, that of the lake above Mitchell Dam on the Coosa River, in Alabama. There, following fairly good preparation of the basin and work on the lake after the impoundage, there was still quadrimaculatus production in numbers great enough to have caused an epidemic of malaria had it not been for the fact that the land department of the company purchased sufficient land almost to depopulate the region within a mile of the lake.

The preliminary preparation of the basin is only a means to an end, for, generally speaking, anti-anopheline work will have to be continued for the first two or three years on most new ponds in order to guarantee control sufficient to prevent malaria.

I will also mention the importance of blood examination, made by a competent technician, in the case of all laborers brought into an area for work in the basin or on the project works.

In the impounded water area discussed in Dr. Smillie's paper, no one who was familiar with the lack of preparation of the basin was surprised at the outbreak of malaria. With quininization the first year, and a pond profusely stocked with gambusia, it was not headed off.

Dr. F. M. Boldridge, Charlotte, N. C.—I should like to ask Mr. LePrince one question: What can be done that is not at present being done by two or three of the large power companies of the South to prevent malarial mosquitoes?

Mr. J. A. LePrince, U.S.P.H.S., Memphis, Tenn.—They should (1) take necessary action so that three years (or not less than two years) before the preliminary topographical surveys are made, the state health authorities shall determine county malaria prevalence and take a malaria census each year thereafter in a zone three miles wide parallel to the flow line until two to three years after the water is impounded. Such work is essential to proper state development and prosperity of counties that have water power sites.

(1a) There is no known reason why the power development agencies of nine Southern states cannot get together as a unit for the sole purpose of seeing that this is done, and that it is done effectively. They should keep a committee to see that this activity is not allowed to die down.

(2) The water power development agencies must obtain through a competent malariologist the past malaria history of every man they place on the water shed of the project from the time work is started until work is completed; and after that of the retained permanent force. Also a malaria blood test of each man must be made at once by a reliable malariologist after the history is given. In addition, a similar malaria history of any sawmill gangs on the water shed should be obtained. A copy of each such record should be sent to the file of the general manager of the company. In the past this matter has been ignored or done superficially, with resultant lawsuits following. Because of this neglect there are potential lawsuits yet to appear in the near future that are anticipated by sanitarians but probably not by the chief engineer and chief surgeon or executives of the companies involved.

(3) All buildings in which construction labor or employes sleep, on or near the water shed, should be kept effectively screened, and arrangements made so that it will not be possible for the screen to be non-effective for a longer period than twenty-four hours. Also all employes known or suspected to be carriers of malaria should take suitable quinin treatment and swallow the pills in the presence of the medical officer or his representative.

(4) It would be highly advantageous to have an inspection made by trained malaria field workers of the state board of health in the month of August, at each farm home two years and one year, respectively, before the lake is formed to determine:

(a) *Anopheles quadrimaculatus* prevalence at each home.

(b) Reported malaria case determination and confirmation.

(c) Location of *Anopheles quadrimaculatus* breeding near homes.

(d) Items (a) and (b) to be repeated in August of the first and second summer after the water is impounded and public records of these four items to be kept on file at the state board of health and copies furnished to the power company.

(5) The agencies interested in the development of water power should form an organization to study antimalaria activity methods and results obtained, and actively encourage the expediting of new anopheles control measures applicable to impounded waters that will reduce first costs and operation costs of malaria elimination at or near impounded water projects.

(6) Full-time county health units should be established so far as possible in advance in all counties that have potential water power sites. It is never too early to establish such units.

(7) On a large (and potentially malarious) project where most of these precautions were taken, there was less malaria after the project was completed than before it started. Also there were no lawsuits.

ENGINEERING IN MALARIA CONTROL*

By J. A. LEPRINCE,**
Memphis, Tenn.

Your Sub-Committee on Engineering has undertaken the investigation of malaria control in areas where large agricultural drainage projects have been installed. We submit the following as a preliminary report:

You will appreciate the fact that it may take several years to collect satisfactory and conclusive data relative to desirable maintenance methods for anopheles control in various parts of

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major drainage schemes, as there are variations of soil that will probably make it essential to have several methods of control available to suit local conditions encountered and to control the collections of floatage and accumulating growths such as semi-aquatic plants that furnish protection for anopheles larvae from their enemies.

In the investigations carried on to date we find there are a number of localities that have been agriculturally drained where the result has been a reduction of anopheles, but where it is found that sufficient anopheles are being produced in the water in the drainage ditches or laterals in July, August and September to be of sanitary importance. In such territory malaria yet appears to be the major health problem of the county health unit, although unfortunately it has not been found that the county health officers are seriously concentrating on or attacking their important malaria problem. They are not even using emergency methods. In some of these large farming areas we find the production of anopheles confined almost exclusively to the drains of the drainage districts, and it is probably safe to state that the malaria sick rate will drop very rapidly as soon as a practical and economic method of mosquito control for the ditches is devised.

The two important sub-problems to be solved are:

(1) The elimination or cheap control of formation of small deltas (or silting of channel) that occurs where laterals or roadside ditches enter the larger ditches, and

(2) The reduction or elimination of plants, grasses and trees in the section of the ditch that stays wet in the anopheles season.

The small deltas referred to often keep water in ditches that would otherwise remain sufficiently dry during the anopheles season to prevent anopheles production. In fact, without these delta-like obstructions, the ditches might act as anopheles egg traps, and frequently as destroyers of young anopheles larvae. Upstream from the small deltas we find ditch water impounded for a distance of from a hundred yards to a quarter mile or more, and sufficient vegetation in this shallow water to protect the larvae. We have also found that willow trees growing in the ditch beds are the cause of serious silting and collection of debris and floatage.

In studying the silting problem in connection with growth of vegetation in ditch beds in general, it has been noted that in several instances where there was sufficient tree shade properly located, there was no vegetation in the water or on the banks: that the water-flow line was free of obstructions and free of satisfactory resting places for anopheles larvae, while immediately upstream and downstream from the properly shaded ditch it was very easy to collect numbers of anopheles larvae.

Investigations carried on during the past ten years in the Carolinas show a similar absence of anopheles larvae where the ditches or stream beds are shaded by wild honeysuckle, and a similar profuse production of larvae of anopheles directly upstream and downstream from the area of sufficiently shaded water surface. Of course, from time to time larvae can be washed into such places, but not many remain and reach the pupal stage. We had our investigations extended to the Texas-Mexican border, and it was found that anopheles production in the borrow pits adjacent to the irrigation water supply ditches can be markedly reduced by proper shading. We found nature at work there doing such work unaided by sanitarians and indicating to us the new anopheles control procedure we are now investigating and developing.

We have been advised that there is no information available as to what extent shade trees affect the growth of aquatic vegetation in irrigation canals or in the borrow pits adjacent thereto.

Our plan is to devise a means of preventing anopheles production in borrow pits adjacent to irrigation ditches in territory where malaria is now on the increase, and to devise a satisfactory means of control of anopheles propagation in the agricultural drainage districts of the Mississippi Valley.

We realize that in certain classes of soils it is possible to reduce anopheles production in relatively flat-bottomed ditches by means of a second or smaller ditch within the ditch bed, but such work will not always reduce the silting problem because of the rank growths that will develop along the dry bed of the old ditch. In the silt soils that flow when water-soaked, we cannot use this procedure, and must use others. If our investigations show that it is feasible and economical to prevent anopheles production in borrow pits and enormously to reduce anopheles in agricultural drainage project laterals by means of proper shading, then the best, quickest and cheapest method of bringing this about will be our next problem, and it will have to be per-

formed in such a manner as in no way to interfere with the operation of ditch-cleaning devices or ditch maintenance machinery.

MALARIA CONTROL WORK IN ALABAMA*

By S. W. WELCH, M.D.,**
Montgomery, Ala.

In 1912 the Alabama Power Company built a dam at Lock 12 on the Coosa River. It backed water up fifteen or twenty miles into the uncut vegetation and timber.

In 1914 the number of malaria cases as reported had increased from approximately twenty-five to six hundred. The people affected sought legal redress through damage suits and, as usual, expert witnesses were called in. Among these was General W. C. Gorgas. Through the many pages of his testimony given in February, 1915, the danger zone was stated and emphasized as 200 yards for the anopheles flight range. The following excerpt is taken from his testimony:

"The anopheles is a little stronger flyer than the stegomyia. Its habits are those of the country mosquitoes, for the reasons I mentioned. Of course, it breeds some everywhere, but these are general terms. Its flight is more than of the stegomyia, though, perhaps, the farthest we put it down at is two hundred yards; I mean for practical sanitary work, in protecting a house or town, we should give directions to take the measures, clearing the trash and draining and looking after the receptacles and so on for two hundred yards around the house."

This case evidently provoked much discussion among malaria men, for the United States Public Health Service assigned Dr. Carter, Mr. LePrince and Dr. Griffitts to the study of this body of water.

That much was found out, we all know today. The control of impounded waters has passed from the realm of investigational findings and theories, through established facts, into the realm of concrete achievements.

There are three large basins in Alabama which have been put up practically within the year. Two were raised during the summer, or at the worst possible time from the health angle. Little malaria has resulted. One of these basins covers 40,000 acres and its waters lap the shores of three counties. The population living within flight range (one and one-half miles) of these basins runs into the thousands. Each basin was prepared under our regulations and our control measures were used after the water was up.

Had these three reservoirs been built ten years ago, a different picture would have been presented.

Not only has our knowledge increased but special control apparatus has been developed from time to time, as the situation on each basin demanded. Men of intelligence have been placed in charge and control organizations formed. These have been guided by the State Board of Health. The cost has run from 30 cents to one dollar per acre pond area. The companies have found this cheaper in dollars and cents than defending damage suits. As the years pass, some basins need less and less control work, and the cost is enormously reduced. The regulations have been strictly enforced, even through appealing to the courts, when necessary. One sixteen hundred acre basin was dewatered and properly prepared as were two others which were smaller.

The purpose and intent of this work is to prevent the building in or increase of malaria foci. All the while, old foci are being found and eliminated wherever possible.

A summary of the projects under permit is given herewith:

Number of impounded water areas	50
Number of counties in which areas are located	24
Number of areas before 1923	4
Number of areas in 1923	8
Number of areas in 1924	8
Number of areas in 1925	21
Number of areas in 1926 (to date)	15
Total number of acres in areas	73,728

List of impounded areas before 1923 (not put up under permit):

Mitchell Dam	1921
Gantt	1921
Newton Dam	1922
Lock 12	1914

Mitchell Dam (5,500 acres) was voluntarily prepared according to directions and no trouble resulted. It is interesting to note that violent epidemics occurred around the other three, Gantt, Newton, and Lock 12.

The total number of areas before 1923 in acres was 29,860. Lock 18 (now under construction) will be 5,000 acres. The grand total is 118,588 acres.

The various counties report the following work done during 1926 to date:

*Report to National Malaria Committee (Conference on Malaria) meeting conjointly with Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

**State Health Officer.

SUMMARY OF MALARIA WORK AS REPORTED BY COUNTIES (ORGANIZED)

Known Epidemic Foci in Counties:

(a) Beginning of season	60
(b) Increase during season	2
(c) Decrease during season	6
Total at present	56
Number of these foci on which medical reconnaissance has been made	47

During Season:

(a) Number of foci eliminated	11
(b) Number of foci partially controlled	37
(c) Number of old foci maintained	22
(d) Population protected	119,300
Cost of control (labor and material)	$12,232.24

Ditching:

New ditching, 15,980 yards, cost $3,995.00.
Old ditching cleared and maintained, 18,400 yards; oiling of foci, 30,000 gallons; total cost about $15,000.00.

Local Mosquito Control Measures were Carried on in:

(1) Birmingham	(5) Mobile	(10) Piedmont
(2) Cloverdale, Chisholm	(6) Demopolis	(11) Anniston
	(7) Bay Minette	(12) Dothan
(3) Selma	(8) Foley	
(4) Opelika	(9) Fairhope	

Counties Not Yet Reported:

Colbert	Mobile
Covington	Montgomery
Lauderdale	Talladega
Limestone	Tuscaloosa

MALARIA CONTROL 1926 AND PROPOSED FOR 1927 IN GEORGIA*

By T. F. ABERCROMBIE, M.D.,**
Atlanta, Ga.

During the year 1926 our Division of Sanitary Engineering rendered service to about thirty municipalities on mosquito and malaria problems, chiefly in sections where anopheles are a menace. County health officers were rendered assistance on malaria problems. Dippings for larvae were taken throughout the state and the anophelene larvae identified. The identifications were spotted on a state geological map, together with the mortality distribution, which map designates the distribution of our malaria problem. Malaria and mosquito literature was distributed as an educational measure. Assistance was rendered in promoting drainage districts. Hydro-electric companies were required to clear areas before impounding water and subsequent control measures were effected. A number of proposed hydro-electric companies are now preparing to comply with regulations regarding impounding of waters. The program for 1927 will be the same as for 1926.

*Report to National Malaria Committee (Conference on Malaria) meeting conjointly with Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

**Commissioner of Health of Georgia.

MALARIA CONTROL OPERATIONS IN MISSISSIPPI*

By FELIX J. UNDERWOOD, M.D.,**
Jackson, Miss.

The organization of the Mississippi State Board of Health embraces a Division of Malaria Control through which advisory and supervisory aid are rendered throughout the State on malaria and mosquito control programs.

The plan in instituting malaria control work is essentially to make a study of the problem within any given county, the county having been adopted as the unit of area, to determine the foci of infection and the factors contributing thereto, and to decide what suitable inexpensive method may be employed to control the disease in the various sections of the county.

In one Mississippi County, beginning in 1921, such a plan was instituted, the results obtained being most satisfactory after six years of continuous operation, the annual per capita cost to the county being six cents, a figure suitable for consideration by any full-time county health department.

By following this plan which is outlined in reports of the Mississippi State Board of Health, any county within the state having an adequate full-time health department and a population of 30,000 or more can satisfactorily reduce malarial fever to the control point within a reasonable length of time, about five years, for an annual budgetary cost not exceeding ten cents per capita, regardless of the extent of the problem, if the work is made part of the general program and continued without interruption throughout the years.

During the past eleven years malaria morbidity in Mississippi has been reduced 52 per cent and mortality 73 per cent.

For the first nine months of the present year there has been only a slight reduction (1.13 per cent) of cases reported as compared to a like period for the preceding year.

Despite the increase in control activities during the year, the expected reduction in cases of malarial fever did not occur, and in general mosquitoes of all of our common species, except

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Aedes sollicitans, were more numerous than for several years past.

During the first quarter of the year, total blood examinations recorded showed positive findings equal to a like period in 1924, and 100 per cent more than in 1925. For the second quarter the rate of positive findings were about equal for 1925 and 1920, and 32 per cent less than in 1924. In the third quarter, with more malaria reported than for a like period during the past six years, blood findings showed 22 per cent less positives than in 1925 and 39 per cent less than in 1924.

Approximately equal numbers of blood smears were examined during the periods except for the first quarter of 1925 when approximately 70 per cent more smears were examined than during the same periods of 1924 and 1926.

For the year 1927 it is planned to continue, through the Division of Malaria Control, the rendering of advisory aid throughout the State, special attention being given to those counties in which there are full-time health units and a malaria problem of sanitary importance. Educational work, and the encouraging of industrial and developmental bodies to realize the economic importance of controlling malarial fever and lend support to its control, will also be continued.

There is not, in the State of Mississippi, any problem in malaria control that cannot be effectively dealt with by following a reasonable program.

The tendency of the desire of the people in this State is toward general mosquito control, and to be able to follow up such a lead would hasten the control of malarial and dengue fevers.

MALARIA CONTROL IN LOUISIANA*

By OSCAR DOWLING, M.D.,**
New Orleans, La.

Since 1918 this Board has advised and assisted communities in mosquito control. During the past biennial period in addition to giving advice and engineering assistance, a start has been made on a program for malaria control on a parish-wide basis. In the parishes of Caddo, Natchitoches, St. Mary and Tangipahoa, surveys have been made to determine amount and distribution of malaria, and the directors and sanitary inspectors of the health units in these parishes have been given training in field work. Programs for the work have been prepared and furnished the directors of the health units, and in Natchitoches and Caddo Parishes particularly, the directors have been assisted in promoting community campaigns, in organizing parish officials and citizens for cooperative effort and in introducing the study of malaria into the schools. The following table summarizes some of the details of the work for 1925:

Communities aided in malaria-mosquito control	18
Surveys and cost estimates for control programs	8
Communities visited	23

The malaria death rate continues to show an annual decrease, the rate for 1924 being 15.1 and for 1925, 13.4 per 100,000 population. In 1918 the rate was 28.7.

The State Board of Health has cooperated with official agencies of the States of Alabama, Mississippi and Louisiana in the request for governmental assistance in the investigation of the salt water mosquito. An appropriation for this work was included in the Agriculture Appropriation Bill. A study is being conducted at the present time of this problem.

*Report to National Malaria Committee (Conference on Malaria) meeting conjointly with Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

**State Health Officer.

MALARIA CONTROL ACTIVITIES IN NORTH CAROLINA*

By H. A. TAYLOR, M.D.,**
Raleigh, N. C.

Beginning in 1922 the malaria control program of the North Carolina State Board of Health was made a part of and to apply primarily to counties having full-time county health organizations.

A Division of Malaria Control is maintained through the cooperation of the International Health Board as a part of the central organization. The division has for its primary objective the rendering of aid, giving advice and to encourage county health organizations in the development of a malaria control program which may be considered applicable to the county in question.

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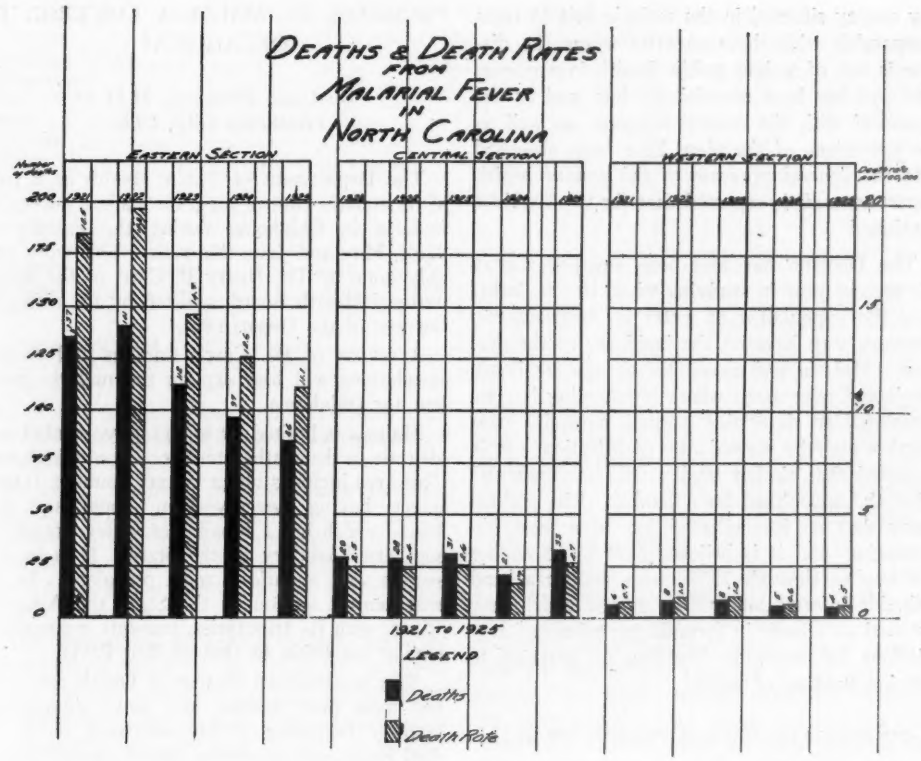
**Director, Bureau of Malaria Control, State Board of Health.



A study of the malaria problem in North Carolina reveals the fact that owing to the wide distribution of the disease in the eastern section, and the opportunities offered for transmission, no definite control program can be offered to the county authorities until a detailed study of the problem has been made as to prevalence, and factors responsible for its spread.

There are at present thirty-six full-time cooperative county health organizations within the State and thirteen of these are situated in the eastern section, or what is known as the malaria belt of the State. Each organization has a rate sufficiently high to make the disease of sanitary importance.

The malaria belt of the State may be said to comprise a total of thirty-three counties situated along the eastern coast. It is within these counties that the harmful effects of the disease is felt, and where the State is concentrating its efforts toward control through the organization of full-time county units with adequate personnel to handle the situation as the prevalence of the disease and its economic importance in each county may demand.

It is believed that the successful handling of any malaria control program is entirely dependent upon adequate and well-trained personnel. In this connection, county health officers, well grounded in the fundamental principles of malaria control, are essential in the development and execution of any plan or program of whatever magnitude may be presented.

That malarial control, or reduction on a county-wide basis, is well within the realm of possibility of the average county health department has been strikingly demonstrated in North Carolina. In two counties, after three years of intensive work by the local county health personnel, there has been a reduction in active malaria of approximately 60 per cent, bringing the rate from what is believed to be the highest for

any county situated in the malaria belt to rates comparable with those counties where the disease is not of serious public health importance. The cost has been surprisingly low, and as the personnel with the control program, as well as the operations of the plan, have been absorbed into the general program of the county health departments, it is expected that the work will be continued.

The Division has also been engaged during the present year in studying what, if any, influence the impounding of water for hydroelectric purposes may have on the incidence of the disease. Malaria and mosquito surveys are being conducted over areas where impounding is contemplated to determine normal mosquito production and the normal rate of infection. It is expected that similar studies will be conducted after the areas have been flooded. The preliminary data so far collected has been most encouraging, and it is believed that by extending the studies through 1927 much additional and valuable information will be gained which may be used as a basis in formulating rules and regulations for mosquito breeding as pertains to the impounding of water.

CONTEMPLATED MALARIA PROGRAM FOR 1927

(1) Extension of the malaria control program on a county-wide basis to two additional counties situated within the malaria belt of the State.

(2) Render aid and advice to county health organizations which may be helpful in determining the status of the malaria problem and the contributing factors thereto in each county.

(3) Field station studies of especially selected counties or areas will be continued as a means of further training the personnel of the various county health departments in the fundamental principles of malaria control.

(4) Surveys of urban areas will be made and estimates of costs will be submitted for the control of mosquito breeding upon request by the governing officials.

(5) Locating of impounded waters in the State and study of the incidence of malaria and mosquito prevalence in relation thereto.

PROGRESS IN MALARIA CONTROL IN OKLAHOMA*

By CARL PUCKETT, M.D.,**
Oklahoma City, Okla.

The Department of Public Health as a part of its malaria control program made a survey of malaria in Oklahoma during the months of April, May and June this year. This work was ably done by Dr. Henry P. Carr, of the International Health Board, assisted by the different bureaus of the Department.

A review of Dr. Carr's findings and recommendations will best explain the malaria problem for Oklahoma.

Malaria is limited by topography, rainfall and altitude to the southeastern section of Oklahoma. This area includes about twenty counties (Oklahoma having seventy-seven counties). Red River, which has a broad, flat valley, forms the southern boundary of the State. It is in this section that malaria is most prevalent. In the east central section of the State the Arkansas River, with its tributaries, presents a somewhat similar condition to that of Red River.

The southeastern section of Oklahoma is for the most part wooded and mountainous, the country becoming prairie westward along the Red River and northwest toward central part of the State. The population is distributed along the fertile valleys of the streams. The rainfall in this section is more than 40 inches per annum. The distribution of malaria is in great part limited to the southeastern quadrant of the State.

Dr. Carr relied upon the presence of an enlarged spleen as a method to determine the incidence of the disease. Children from two to twelve years of age were examined in their homes. In addition to the examination of the spleen, histories and blood films were taken.

The table at the top of next page gives the incidence of malaria in Oklahoma in the counties investigated, as determined by splenic index.

The incidence and severity of malaria in Oklahoma has been on a decline for the past ten or fifteen years. This can be in part explained by the fact that the land has been cleansed of

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**State Health Commissioner.

INCIDENCE OF MALARIA IN OKLAHOMA COUNTIES

County	Type of Terrain	No. of Exams.	No. Pos.	Per Cent Pos.
McCurtain	Valley	309	63	22.0
Pushmataha	"	295	65	22.0
Choctaw	"	209	41	14.1
Bryan	"	225	47	20.3
Pittsburg	"	64	14	21.3
Pittsburg	" Near Impounded Reservoir No. 3	21	11	52.3
Latimer	"	49	16	32.6
LeFlore	"	113	39	34.5
Muskogee	"	77	16	20.3
Muskogee	Prairie	67	2	2.9
Canadian	"	71	3	4.2
Total examinations in valley section		1,362	317	23.2
Total examinations in prairie section		138	5	3.6

timber and more drainage projects have been put into effect with the increasing agricultural development.

It would, however, be unfortunate to allow the fact of this natural decline in the disease incidence to obscure the importance of the very considerable magnitude of the malaria problem which exists at the present time in southern and eastern Oklahoma.

The development of the oil industry probably plays a minor part in the decline of the case rate.

The Future Possibilities of Impounded Water in Oklahoma.—The development of water power in Oklahoma has not been carried out to any extent. However, it is a question of only a short time until the water power resources of eastern Oklahoma will receive attention. In the future the malaria control problem will be largely concerned with the proper impounding so as to eliminate as far as possible the production of breeding places of the anophelene mosquitoes. Dr. Carr's investigations around the lake in McAlester, Pittsburg county, demonstrated the importance of this phase of the problem. He examined twenty-one individuals who had lived within the area through at least one malarial season. Of these, 52.3 per cent had enlarged spleens and 44.1 per cent gave histories of chills and fever within the previous year. In the construction of this lake very little clearing of the basin was done before the water was impounded. At present there is under consideration the impounding of a much larger lake in the malarial region of the State. The Department of Health, through its sanitary engineers, is planning to take necessary steps to prevent the formation of malarial hazards such as that of Lake McAlester. The problem of impounding water will necessitate the securing of legislation covering this phase of the problem, precedent for which exists in the regulations already in force in other Southern States.

Organization of County Health Units.—Probably the most important step taken in the control of malaria in Oklahoma has been the organization of local full-time county health units in three of the largest counties of the area concerned. In these counties adequate programs are already under way which promise the solution of the malaria problem. This program consists essentially of the determination by the health officer of the relative magnitude of the local health problem due to malaria. The health officer then prepares from all data available, including spleen examinations of the school children at the time of the regular school examination, a malaria spot map of the county, showing location of all cases of the disease. Where the individual problem is well defined, the cases of malaria and the breeding places of *Anopheles quadrimaculatus* found, a summary of the observations is made and presented to the State Bureau of Epidemiology. This bureau will then suggest the most practical and inexpensive method of control.

In addition to this specific program, there is another important activity that we have included in the work of malarial control, namely: general education of the public in regard to the whole subject of malaria prevention, and instruction in the common, simple, well-proven methods of anopheles control.

MALARIA CONTROL ACTIVITIES IN TENNESSEE*

By E. L. BISHOP, M.D.,**
Nashville, Tenn.

The basic element of the malaria control program for the Tennessee State Health Department is the establishment of full-time health organizations as rapidly as possible in all counties with a malaria problem. Up to the present, six county health departments have been established in West Tennessee, which is the only section of the State having a malaria problem. Four of these county health departments—Obion, Dyer, Lauderdale and Shelby—fall in the tier of six counties which border the Mississippi River. An attempt is being made to develop malaria control operations as a major activity in these four counties, and in the counties of Weakley and Gibson. The general plan of attack is by educational work and anti-mosquito measures. An attempt is also being made to secure placement of the "standard treatment" for sale in both drug stores and cross-road stores.

The Division of Sanitary Engineering has made surveys of malaria breeding places on a county-wide basis in Weakley county, and of certain areas in Lauderdale and Shelby counties. Consultant service is being rendered by this Division to all full-time health departments in West Tennessee. Town surveys have been made of Clarksville, Dresden, Martin, Greenfield, Covington, Dyersburg and Gallatin.

During 1925, Tennessee experienced its first malaria epidemic due to impounded waters. This was at Cookeville, where the city had installed a municipal hydro-electric plant, damming up Falling Water River for some three miles. Control measures were instituted immediately as follows: The reservoir was cleared of floating and standing timber, and the edges of grass and brush. Oiling and prophylaxis were used.

Surveys were made this year (1926) early in the spring, at Falling Water River dam for maintenance, and a survey for results was accomplished about the middle of September. The results of the latter survey are as follows:

Persons in survey	93
Malaria cases in 1925	37
Malaria cases in 1926	15
Net reduction in cases	22
Reduction in malaria evidently due to malaria control work at the reservoir	59.4%

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**Commissioner of Health of Tennessee.

OUTLINE OF MALARIA CONTROL WORK IN TEXAS*

By H. O. SAPPINGTON, M.D.,**
Austin, Tex.

In 1924-25, 101 towns in Texas were listed as carrying on malaria control measures; 76 employed full-time inspectors and 25 part-time, with occasional visits by representatives of the State Board of Health. In 1925-26, 86 towns had full or part-time inspection, while 52 had intermittent local inspection as complaints were registered, and had occasional visits by a representative of the State.

Approximately $55,000 was spent by towns having a regular budget item for malaria control; this amount was probably equalled by towns making no fixed expenditures, but having adequate provision for the work. The Engineering Department expended the $5,000 annually appropriated by the Legislature for malaria control. The entire expenditure in the State for the biennial period was, roughly, $120,000.

The towns listed for mosquito control work are situated in 104 counties, approximately 95,000 square miles in area, and represent a population of over four million; something like 80 to 90 per cent of the entire population. The work was confined to incorporated towns and cities, so that only a part of the population was directly affected.

Mosquito control of some sort is performed in connection with almost all organized efforts in public health work in the State. Malaria control work, pure and simple, is confined almost entirely to the "malaria sections" which lie principally in the eastern, southern and central parts of the State. (See accompanying map for location of heaviest malaria incidence.)

Mosquito control, with particular reference to the *aedes*, was carried on for years on the border under the supervision of the U. S. P. H. S. This work was abandoned in June, 1926, as the mos-

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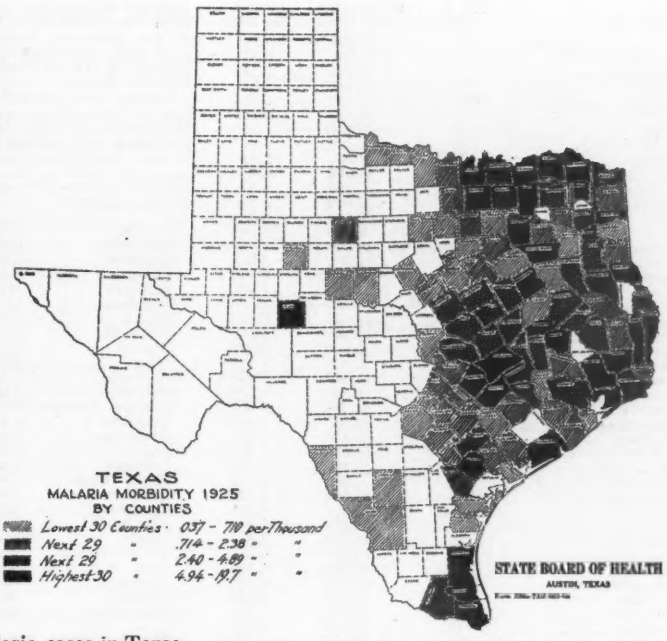
**State Health Officer.

quito index had receded so as to be of small importance. Local communities and county health units in this section are continuing this work, covering an area of some twenty to thirty thousand square miles, and embracing a population of about a hundred thousand. The State Board of Health provides necessary supervision over this work as well.

One hundred ninety-two deaths were reported from malaria in 1925—a small rise over the previous years. Approximately 70 per cent of deaths are at present reported in Texas, and 11,502 cases of malaria were reported by a woefully incomplete number of physicians. It would probably be no exaggeration to say that the average yearly number of malaria cases in Texas was 50,000 or over.


TEXAS
MALARIA MORBIDITY 1925
BY COUNTIES
Lowest 30 Counties · .037 - .710 per Thousand
Next 29 " .714 - 2.38 " "
Next 29 " 2.40 - 4.89 " "
Highest 30 " 4.94 - 19.7 " "
STATE BOARD OF HEALTH
AUSTIN, TEXAS

In each town where the services of the State Board of Health have been extended, it has been the policy to inform the people as to the various methods for control, emphasizing the protection to be gained from properly screened houses. Destruction of breeding places around houses, including harboring places, is likewise instituted. It has been shown that a weed-cutting campaign is useful in that it uncovers multitudes of old tin cans, bottles and other receptacles which afford breeding places for culex. Campaigns against pest mosquitoes are conducted in conjunction with malaria control campaigns for the usual obvious reasons.

In those towns not having the advantage of good natural drainage, it has been found economical to spend money on digging ditches for permanent drainage. The city of Tyler found the use of dynamite an economical investment in ditch-digging. Some towns have been fortunate in getting cheap or free crank-case drainage from garages, and have found it cheapest to oil local streams and ponds, while still others, who are supplied with cheap labor, clear their waters of weeds and debris and stock them with fish as a control measure.

TABLE OF MALARIA MORBIDITY IN TEXAS, BY COUNTIES, FOR YEAR OF 1925

County.	No. of cases.	Population (est. 1925)	Rates (per 1000)
Anderson	16	35,400	0.452
Angelina	50	27,000	1.85
Austin	78	18,100	4.31
Bastrop	155	28,500	5.44
Bee	52	12,200	4.03
Bell	50	54,000	0.925
Bexar	11	182,000	0.0605
Bosque	11	17,400	9.925
Bowie	177	42,900	4.23
Brazoria	28	16,900	1.66
Brazos	72	22,400	3.21
Burleson	122	21,200	5.75
Burnet	2	9,870	0.202
Caldwell	23	29,200	0.788
Calhoun	2	4,200	0.477
Cameron	384	45,700	8.40
Cassa	50	32,500	1.54
Chambers	67	3,400	19.7
Cherokee	129	40,500	3.18
Clay	9	15,900	0.566
Coleman	2	22,400	0.134
Collin	196	56,400	3.48
Colorado	24	20,100	1.19
Comal	4	8,950	0.447
Comanche	1	22,400	0.045
Cooke	161	24800	6.09
Coryell	24	25,900	0.926
Dallas	127	215,000	0.59
Delta	51	16,950	3.01
Denton	282	36,000	7.84
DeWitt	97	33,500	2.90
Ellis	128	60,800	2.11
Falls	105	42,700	2.46
Fannin	689	48,700	14.14
Fayette	164	30,400	5.40
Fort Bend	53	24,000	2.21
Franklin	10	9,650	1.04
Freestone	178	26,400	6.75
Galveston	22	49,300	0.446
Goliad	65	11,700	5.55
Gonzales	36	33,900	1.06
Grayson	281	77,500	3.63
Gregg	108	18,600	5.80

County.	No. of cases.	Population (est. 1925)	Rates (per 1000)
Grimes	127	26,000	4.89
Guadalupe	31	32,000	0.97
Hamilton	2	14,400	0.139
Hardin	208	17,400	11.95
Harris	478	183,000	2.61
Harrison	12	56,000	0.212
Hays	21	17,100	1.23
Henderson	196	32,600	6.01
Hidalgo	145	48,500	2.99
Hill	59	48,600	1.21
Hopkins	91	37,900	2.40
Houston	88	35,000	2.51
Hunt	286	55,100	5.19
Irion	13	1,530	8.50
Jackson	157	20,200	7.78
Jefferson	287	81,500	3.52
Johnson	19	37,600	0.506
Jones	24	27,000	0.89
Karnes	44	24,400	1.80
Kaufman	289	44,800	6.45
Lamar	343	56,400	6.10
LaSalle	4	8,800	0.455
Lavaca	11	25,400	0.434
Lee	106	15,900	6.66
Leon	11	19,950	0.551
Liberty	161	17,400	9.25
Limestone	187	44,800	4.17
Madison	111	12,900	8.60
Marion	103	14,050	7.33
Matagorda	176	13,800	12.75
Maverick	2	7,000	0.286
McLennan	258	87,000	2.97
Milam	128	41,700	3.07
Mitchell	1	11,900	0.084
Montague	38	21,050	1.80
Montgomery	42	19,300	2.18
Morris	33	11,450	2.88
Nacogdoches	202	33,900	5.96
Navarro	35	66,600	0.525
Newton	29	10,600	2.74
Nueces	12	29,000	0.414
Orange	38	16,000	2.38
Palo Pinto	13	20,100	0.65
Panola	55	25,700	2.14
Parker	5	21,800	0.23
Polk	76	19,650	3.87
Red River	264	37,300	7.08
Robertson	112	30,800	3.64
Rockwall	45	9,200	4.89
Runnels	6	21,200	0.283
Rusk	129	32,700	3.95
Sabine	40	13,400	2.98
San Patricio	11	15,700	0.70
Shelby	163	33,000	4.94
Smith	39	54,900	0.71
Tarrant	258	134,000	1.925
Titus	97	18,200	5.33
Travis	76	65,100	1.18
Trinity	71	15,550	4.56
Tyler	8	11,200	0.714
Upshur	110	25,500	4.31
Van Zandt	38	33,800	1.124
Victoria	19	18,100	1.05
Walker	94	18,100	5.20
Waller	7	11,500	0.609
Washington	170	28,500	5.97
Webb	7	38,500	0.182
Wichita	2	54,000	0.037
Willacy	59	4,700	12.56
Willbarger	7	17,800	0.393
Williamson	203	45,600	4.45
Wilson	38	21,800	1.76
Wise	17	22,300	0.762
Wood	64	28,700	2.23
118	11,210	3,951,650	2.837

Rate for population of reporting counties, 2.837 per thousand.

Rate for total estimated population of Texas (5,040,000), 2.224 per thousand.

The estimated population was arrived at by adding one-half the growth between 1910-1920 to 1920 figures. The estimated population of counties was obtained by the proportionate school enrollment (1924) of each county, based on a total of 5,040,000 population and 1,321,012 school enrollment.

The malaria figures were obtained from monthly reports of cases seen sent in by Texas physicians. The absolute figures are therefore probably much too low. Even for comparative purposes, they are partly vitiated by the imperfect reporting, some counties in the malaria belt reporting no cases whatever. However, the figures do give a rough idea of the distribution of malaria in Texas.

During 1926 the following towns obtained good control of mosquitoes, and most of them maintain full-time sanitary inspecting forces. However, the problem does not persist the year round in all of these towns, hence the inspector is employed strictly for mosquito control work during the most auspicious season for mosquitoes, namely, from May to October or November:

Austin	Godthwaite	Mt. Pleasant
Beaumont	Gorman	Nacogdoches
Bellville	Greenville	New Braunfels
Blooming Grove	Henderson	Normangee
Bonham	Hico	Paris
Brenham	Hillsboro	Pineland
Bryan	Honey Grove	Robstown
Cameron	Houston	San Antonio
Center	Huntsville	San Augustine
Cisco	Hubbard	San Marcos
Cleburne	Italy	San Saba
Coleman	Jacksonville	Somerville
College Station	Kerrville	Rockwall
Commerce	Lancaster	Rusk
Cooledge	Laredo	Taylor
Dallas	Livingston	Teague
Denison	Lone Oak	Terrell
Eagle Pass	Groveton	Timpson
Eastland	Hearne	Trinity
Edgewood	Longview	Tyler
Elmina	Lufkin	Waco
Ennis	Malone	Waxahachie
Farmersville	Marshall	West
Fort Worth	McKinney	Will's Point
Fourney	Meridian	Wortham
Garland	Mesquite	
Gatesville	Mexia	

The following towns obtained only partial control, because of indifference or only spasmodic efforts being put forth:

Alto	Frost	Mineola
Alvarado	Groesbeck	Mineral Wells
Athens	Jefferson	Navasota
Atlanta	Killeen	Palacios
Brookshire	Kosse	Palestine
Caldwell	Mabank	San Felipe
Calvert	Marlin	Rockdale
Canton	Mart	Temple
Carthage	Midlothian	Trinidad
Franklin	Milford	Weatherford

MALARIA CONTROL ACTIVITIES IN VIRGINIA*

By H. G. GRANT, M.D.,**
Richmond, Va.

The program for the year 1926 carried out by the organized counties of Virginia in which malaria is a problem was as follows:

(A) (1) Locate all ponds (natural and artificial) and write pond description. Sample "A" will give you an idea. .

(2) Dip all located ponds once a month for larvae.

*Report to National Malaria Committee (Conference on Malaria) meeting conjointly with Southern Medical Association, Twentieth Annual Meeting, Atlanta, Georgia, November 15-18, 1926.

**Director of Malaria Control, State Board of Health.

Identify and make records on charts, as sample "B".

(3) Collect adult anopheles once a month and record on chart, as sample "C". Charts furnished by the Malaria Bureau.

(4) A free-hand sketch to be made of every pond, including one mile of surrounding territory. Scale not necessary. Sample "D".

(B) Home history index of 1925 and 1926 and spleen index of malaria for 1926 at end of season around all ponds within flight range. Record on map as per instructions. Office record to include name of occupant, house number, number of occupants and malaria cases.

(C) Investigation of every case of malaria reported during year by physicians and from other sources.

(D) Securing actual control by screening, oiling, Paris green, and drainage when possible. Control of ponds by clearing of floatage and varying water level.

(E) Supervision of maintenance of urban malaria control and securing new work where necessary.

(F) Educational work through schools, lectures, literature, posters, newspaper publicity, and exhibits.

To complete this program it was necessary for the county health officer in all counties to devote one full day of his time per week from the beginning of May until the end of November. In two counties, Nansemond and the Isle of Wight, malaria is a major problem, and it has been necessary for the health officers to devote two, and sometimes three, days a week to fulfill this program.

In all our counties the ponds have been located, sketched, and dipped at regular intervals. Adult anopheles have also been trapped, identified and recorded. The home history index has been taken, and is complete for the areas surrounding the ponds, with the exception of our two counties, Nansemond and Isle of Wight, where it is only possible, with the amount of time allocated, to do a certain amount of this work. Spleen indices will be completed during the latter part of November and the first two weeks in December.

The amount of control effected has not been very great. The idea in this program was to locate exactly our malaria foci, so that in 1927 we could intensify on control.

Control by the towns was featured during the beginning of our malaria work in Virginia. This work is still being maintained, and is in good shape.

In the unorganized counties the only work done has been educational, with the exception of surveys which were made in the counties of King George, Mecklenburg and Middlesex.

Control Work Supervised During 1926.—The major control in Virginia has been carried out at Lake Prince under the supervision of the county health officer of Nansemond County. Lake Prince is a water supply for the city of Norfolk. The city has already cleaned the lower part of the lake, and during October began to clean the bights which extend into Isle of Wight County. These bights have been created by flooding the wooded area, and, as a consequence, there are many trees standing in the water. For the purpose of cleaning, a special scow has been constructed. In the front of the scow there is a large circular saw which can be lowered by a lever. The scow is brought up and the saw lowered so that the tree is cut well below the water level; the tree is then hooked on to a hawser and from there run on to the shore. Fluctuation has also been carried out in this lake with complete success in the cleared portions. The following figures show clearly the amount of control effected:

	1924 Pct.	1925 Pct.	1926 Pct.
Home History Index	53.8	44.3	14.05

Lake Cohoon, in the county of Nansemond, is also a heavy breeder. It is the reserve water supply for the city of Portsmouth. Negotiations are under way to have this lake cleaned.

Lake Kilby, which is the water supply of the city of Portsmouth, has this year shown breeding in scattered areas, for the first time since 1924. Its edges will be cleaned.

In James City County a re-impoundment has been constructed under the supervision of the county health officer.

In Brunswick County a swimming pool, which was breeding moderately, has been drained.

One pond in Henrico County has been drained.

In Accomac County this year only one pond bred *quadrimaculatus* heavily.

The health officer of Isle of Wight County has conducted control himself by the use of a mixture of Paris green and road dust.

Ditching and oiling with oil-soaked sawdust has been carried out by many of the towns.

In Quantico a very interesting study and control is being carried out by Surgeon L. L. Williams, Jr., of the United States Public Health Service, with Dr. S. S. Cook, Medical Corps,

United States Navy. Here control of anophelene breeding has been effected by the use of Paris green distributed from an aeroplane. Experiments are also being made with the distribution of kerosene from the air. This is in the experimental stage.

At Virginia Beach malaria control has been carried out with success. This work was supervised by Dr. L. L. Williams. Paris green mixed with road dust was used for anopheline control. It was necessary at times to use sawdust soaked with oil to control culex breeding. No effort was made at controlling the breeding of the salt marsh mosquito.

Screening.—Screening has been improved throughout all our counties. It is felt, however, that, with the exception of Greensville County, where a screening campaign was carried out by Mr. R. A. Deal, the sanitary officer, screening was instigated primarily for protection from pests, and that malaria was a secondary consideration. No accurate figures can be given as to the improvement in this respect.

In certain counties, particularly Accomac, Northampton, and in the sections where intensive farming is carried out, a large amount of drainage has been effected by the use of tile. This of course, was done purely from an agricultural standpoint.

Quinine has been advocated as a useful adjunct to control. The standard treatment has been advised, although we do not feel that it is a cure.

Education.—Educational work of the usual type through the schools, moving pictures, and circulars has been conducted during the early part of the season.

In estimating the amount of malaria in the State, the only data we have for this purpose are the reports of the private physicians. These reports would lead us to conclude that malaria is rapidly disappearing in the State of Virginia. Our reporting system, however, is not one which would allow us to place too much faith in reports of any diseases, and it is our experience that malaria is not well reported. However, from personal observation, from the opinion of the county health officers where home surveys are taken, and from talking to physicians living in all parts of the State where malaria has been prevalent, we are quite safe in stating that malaria is certainly on the decrease. Below is given a table showing cases and deaths from malaria for the State at large:

Year.	Cases.	Deaths.
1923	3,611	47
1924	2,485	35
1925	1,838	34
*1926	1,239	16

*January-September, inclusive.

The percentage of physicians reporting in 1924 was 80; in 1925 it was 79, and the figures compiled so far for 1926 show that the percentage will be practically the same. So, taking reporting as a mode of estimation, these figures need no correction. In our organized counties it is not possible to give a correct comparison of the incidence of malaria for this same period, as the results of the home surveys and the spleen indices were not compiled for previous years.

Legislation.—The State Board of Health of Virginia has regulations for cleaning, fluctuation, or other necessary means of control. Legislative opinion, however, differs as to whether control may be effected by enforcing the regulations. Legally it involves the question as to whether a State has the power to delegate legal authority.

The Program for 1927.—The program for 1927 will be the securing of legislation so that we may go ahead with control. Certain breeding places in each county will be chosen and the time of the county health officer directed towards the control of these sections. The urban work will be continued and educational work carried out in all our malarious sections. The development of new rural work will depend upon the organization of new county health departments.

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DR. M. Y. DABNEY, Editor
C. P. LORANZ, Secretary-Manager

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
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INSTABILITY OF BACTERIAL SPECIES

Physicians are not generally aware of the enormous volume of literature that has appeared in the years since bacteriology became a science, upon the subject of bacterial reproduction, and variation in bacterial type. The frequent difficulty of identification of an organism causing an obvious human infection is known. Very recently in the JOURNAL a case of typhoid osteitis was reported in which the organism could not be identified for a number of months, although it was grown in culture, because it was nonmotile.[1] *Bacillus typhosus* is, of course, usually motile. Many instances have been reported of a bacterium which lost one or more of its fermentative powers, its pigment-producing or hemolyzing power, agglutinability or other of the characteristics which commonly identify it. In fact, most of the reactions by which determinative bacteriology attempts to classify a given organism may vary under certain conditions.

Hadley,[2] in the *Journal of Infectious Diseases*, has attempted to correlate the phenomena which occur when bacteria are grown on different culture media, at various temperatures, in the presence of immune sera, dyes and antiseptics, or in the presence of the lytic principle or bacteriophage of d'Herelle, under the general term microbic dissociation. And he discusses the relation of bacterial variation to production of bacterial disease.

It has been rather generally accepted for many years that bacteria reproduce by simple fission, but the possibility that they have also a cycle of sexual reproduction is being considered.[3] The key to the sexual stages may be found in some of the so-called degeneration or involution forms, frequently found in old cultures, and formerly regarded as of no significance. The study of bacterial variation is fraught with many technical difficulties. There is frequent opportunity for chance contamination and much work on the subject has been worthless.[4] [5] Definite colony and other variations have been so frequently observed, however, in a line of bacteria grown from a single cell that their regular occurrence should be taken into account.

The majority of bacteria will dissociate, Hadley concludes from an extensive review of the literature, into three general types which he calls the S, the R and the intermediate or O forms. The S form is commonly more virulent when injected into animals, and is not readily phagocytosed in the blood stream. In the presence of immune serum it dissociates into the R form, which is less virulent usually and more easily phagocytosed by the circulating leucocytes. In the treatment of infection, a *sterilizans magna*, by an antiseptic such as gentian violet, mercurochrome, or arsphenamine, may not be the desideratum. The control of the cyclostage, or the dissociation of the organism into a form in which it may be phagocytosed, may offer a more effective means of combating disease.[6]

ACIDOSIS IN NEPHRITIS

The kidney is very important in acid-base metabolism, and selectively excretes acid phosphates and carbonates when acid predominates in the system, and alkaline phosphates and carbonates when an excess of alkali is present. A change in its ability to eliminate acids has been

1. Garr, C. C.: Typhoid Osteitis. JOURNAL, 20:296, April, 1926.
2. Hadley, Philip: Microbic Dissociation. Jour. Inf. Dis., 40:1-312, Jan., 1927.
3. Mellon, R. R.: Life Cycles of the Bacteria and Their Probable Relation to Pathology. Amer. Jour. Med. Sci., 159:874, 1920.
   Ibid. Studies in Microbic Heredity. Jour. Bact'y, 11:203, 1926. For further bibliography, see Hadley 2 above.
4. Brown, J. H.; and Frobisher, Martin: Technical Difficulties Encountered in an Attempt to Produce Bacterial Mutations. Bull. Johns Hosp., 40: 318, May, 1927.
5. Pryor, R. W.: Cause of Scarlet Fever. Amer. Jour. Pub. Health, 15:847, 1925, quoted by 4.
6. Enderlein, G.: Bakterien-Cyclogenie. Quoted by Hadley, 2 above.

recognized as one of the fairly constant symptoms of renal disease. There is usually a high acidity of the urine, with decrease in urinary ammonia in nephritis of the glomerular type; and the amount of alkali necessary to render the urine alkaline is increased in nephritis. It has been suggested that nephritis may lower the alkali reserve and plasma hydrogen-ion concentration; and that acid elimination may thus be the etiologic factor in nephritis.

If acid is injected in quantity into animals subcutaneously, intravenously, or by stomach tube, albumin and casts may be found in the urine. If hydrochloric acid is injected subcutaneously into rabbits or dogs, a picture of acute nephritis results. Human beings in a state of alkalosis may also show albumin and casts.[1]

Seegal[2] has conducted experiments to determine whether a mild chronic acidosis over a long period of time will permanently damage the kidney. She administered acids or acid-producing salts to rabbits and dogs by stomach tube in quantities to maintain acidosis for months. With the dogs, maintenance of mild acidosis was easier than in rabbits, and it was very difficult to produce a markedly acid urine.

The weight of the animals went down. This is in harmony with findings among human subjects, that man in a condition of acidosis, even for a very brief period, loses weight, and in alkalosis gains weight, because more water is retained by alkaline tissues. In acidosis the body fat is decreased. One of Seegal's rabbits had progressive softening of the teeth during the last two months of its life. When it died the lower front teeth were practically gone, and on analysis they were markedly deficient in calcium. The bones of the skull were so thin that they could easily be cut with scissors. Loss of calcium and fat in experimental acidosis has previously been reported.[3]

Severe acidosis, or mild acidosis over a long period, resulted in a clinical picture of nephritis, with albumin and casts in the urine. But on autopsy the kidney did not show evidence of chronic nephritis. The picture appeared of mild acute injury to the tubular epithelium, essentially that of cloudy swelling. Even when the acidosis had been prolonged for a year, there was no permanent injury to the kidney, and repair was rapid if the acid administration was stopped.

It should be recalled by those doing life insurance examinations and general examinations for diagnostic purposes that excretion of excessive quantities of acid or alkali by the kidney may be concomitant with the appearance of albumin and casts, which may later disappear without evidence of permanent kidney damage. The picture of nephritis may be similated by a temporary disturbance in the acid-base metabolism.

1. Koehler, A. E.: Effect of Acid and Base Ingestion Upon the Acid-Base Balance. Jour. Biol. Chem., 72:99, March, 1927.
2. Seegal, B. C.: Chronic Acidosis in Rabbits and Dogs with Relation to Kidney Pathological Change. Arch. Int. Med., 39:550, April, 1927.
3. Goto: Mineral Metabolism in Experimental Acidosis. Jour. Biol. Chem., 36:355, Nov., 1918, quoted by 2.

CALCIUM ASSIMILATION

Many different portals of entry into the animal body have been provided by nature for vitamin D, the principle necessary in the animal economy for calcium metabolism. The antirachitic principle may be obtained from food which the animal eats, or from substances in his skin if he is exposed to ultra-violet radiation. Hess suggested that the vitamin itself might be absorbed through the skin as well as through the alimentary canal, and in the case of sheep, lanolin in the wool might be activated by ultra-violet rays and then absorbed by the animal.

Cholesterol is activated by ultra-violet radiation outside the body.[1] An animal on a rickets-producing diet, which eats small quantities of irradiated cholesterol, grows normally; and for a time it was thought that cholesterol was the usual precursor of vitamin D.

Rosenheim and Webster[2] claim, however, that the parent substance of vitamin D is not cholesterol but an impurity which is found in most naturally occurring cholesterols. Purified cholesterol, they say, may not be activated to form an antirachitic substance. Cholesterol may be freed from the provitamin substance by bromination of its unsaturated bonds, by treatment with potassium permanganate, and by other methods. The real provitamin, which they think is ergosterol or a similar highly unsaturated sterol, may be separated from the cholesterol by precipitation and then activated by exposure to ultra-violet rays. A very small dose of the irradiated ergosterol, one-ten-thousandth of a

1. Editorial: Sunlight and Vitamin D. JOURNAL, 18:628, Aug., 1925.
2. Rosenheim, Otto; and Webster, T. R.: The Parent Substance of Vitamin D. Biochem. Jour., 21:389, 1927.

milligram per day, protected rabbits on a rachitic diet from rickets.

In studies of the absorption of the antirachitic vitamin through the skin,[3] rats and rabbits were kept about a month on a diet low in vitamin D, then irradiated active cholesterol or vitamin D was applied over a bare depilated patch of skin. Good bone calcification was obtained when the vitamin was rubbed into an area of only one square inch. Similarly, if very small portions of rabbit skin were irradiated with ultra-violet rays for ten minutes three times per week, calcification was only slightly inferior to that of the controls on a full diet.

It is astonishing that, if such minute quantities of a protective substance or light ray ingested or absorbed from the surface of the body will prevent rickets, anyone ever develops the condition. Yet defective calcification is almost universal among the world's population today. It is due perhaps to feeding customs, perhaps to indoor habits. Other factors than vitamin deficiency certainly play a role. It was mentioned above that in prolonged acidosis decalcification of the bones and teeth occurs.[4]

Perhaps human hair oil contains a provitamin as does lanolin. If hats were worn less regularly, its provitamin might be activated by sunlight and absorbed into the system through the scalp.

Memphis—Where We Meet

MEMPHIS AS A CONVENTION CITY*

As a convention city, Memphis, Tennessee, offers certain advantages and attractions unsurpassed by any city in the country. Centrally located and served by ten trunk line railroads operating seventeen branches, Memphis is easily accessible from all parts of the United States. Through Pullman service in many instances, with only one change necessary in others, adds to the ease and comfort of travel to this city.

When he arrives in Memphis the convention delegate and visitor finds everything useful for his comfort, his entertainment and the easy and efficient dispatch of the business of the organization he represents. Memphis hotels rank with the best in the United States. Completion of the new Hotel Peabody has given to Memphis a $5,000,000 hostelry with 600 guest rooms: a hotel that has no equal outside New York, according to seasoned travelers thoroughly familiar with the hotel facilities of the country. There are other downtown hotels—the Claridge, the Gayoso, the Chisca, the Ambassador, and a number of smaller hostelries famous alike for their comfortable rooms, their service and their cuisine. In the residential section of the city is the Parkview Apartment Hotel, a new and capacious structure.

The Municipal Auditorium is equipped to take care of great national bodies assembled in convention. With a seating capacity of 12,500, the Auditorium can be so arranged as to provide two halls, one seating 6,500, the other seating 2,500, each with its own stage. There are numerous assembly rooms, committee rooms, and all the equipment needed for a convention. If the South or Concert Hall of the Auditorium, with a seating capacity of 2,500, is large enough to take care of the sessions of the convention, the North Hall, with a seating capacity of 6,500, can be transformed into an exhibit hall.

The Memphis Convention and Tourists' Bureau, a division of the Chamber of Commerce, maintains a staff, efficient and thoroughly trained, to aid local committees in the perfecting of their entertainment plan.

INDUSTRIAL MEMPHIS

Memphis is the heart of the richest agricultural section in the world, and the geographic and trade center of a prosperous and progressive territory. Incorporated by the Tennessee Legislature in 1826, Memphis is the largest city in Tennessee and the fourth largest in the South. The affairs of the city are administered by a City Commission, made up of the Mayor and four Commissioners.

Memphis has a population of 256,056, according to the 1926 city directory. The area of the city is 25.3 square miles. It occupies a strategic position on the Mississippi River in the heart of a great agricultural and trade territory. Memphis is the recognized gateway to the South and Southwest.

Geographical and other advantages, including rail and river transportation with favorable freight rates, make Memphis the best distributing point in the South; and it is the South's largest distribution point for automobiles, farm

3. Hume, E. M.; Lucas, N. S.; and Smith, H. H.: Biochem. Jour., 31:362, 1927.

4. Editorial: Acidosis in Nephritis, p. 493, this issue.

*From the Publicity Division, Mrs. Percy Finlay, Director, Memphis Chamber of Commerce.

Mississippi River at Memphis

implements and hardware, and one of the largest for iron and steel.

Here are some of the things in which Memphis is pre-eminent:

It is the greatest inland cotton market in the world. It handled 1,999,630 bales of cotton last year.

It is the largest hardwood lumber producing market in the world.

It is the largest producer of cotton seed products in the world, and is the home of the world's largest cotton warehouse and terminals.

It is the largest sweet food manufacturing center in the South, the largest wholesale drug market in the South, the cheapest cash retail grocery market in the South, and is the home of the retail grocery chain stores.

Memphis is the home of the largest hardwood flooring company in the United States, and the largest snuff factory in the world.

Through the Mississippi River, with its Federal and other barge lines, and the Panama Canal, Memphis has an all-water haul to the ports of the world.

The Memphis Health Department has been given a rating that places it first among cities of from 100,000 to 250,000 population.

The Memphis Artesian Water Department is the largest artesian water system in the world. The daily pumping capacity of the new municipal plant is 60,000,000 gallons a day. The daily consumption in summer is 19,000,000 gallons a day. In winter it is 15,000,000 gallons.

From the Mayor of the City to the newsboy on the streets, a cordial and spontaneous welcome awaits the convention guest, who always finds Memphis in hospitable mood. Truly, the latchstring is on the outside.

Book Reviews

Principles of Chemistry. An Introductory Textbook of Inorganic, Organic and Physiological Chemistry for Nurses and Students of Home Economics and Applied Chemistry. By Joseph H. Roe, Ph.D., Professor of Chemistry, George Washington University Medical School; Lecturer in Chemistry, Central School of Nursing, Washington, D. C.; Captain, Sanitary Division, U. S. Medical Reserve. 378 pages, illustrated. St. Louis: C. V. Mosby Co. Cloth, $2.50.

Considering the subject presented and the space allowed this textbook compares favorably with similar works. The author has shown care in the selection of the experiments, and the book should receive a welcome from teachers in secondary schools as well as instructors of student nurses.

Diseases of the Heart, Their Diagnosis, Prognosis and Treatment by Modern Methods. By Frederick W. Price, M.D., F.R.S. (Edin.), Physician to the National Hospital for Diseases of the Heart; Consulting Physician to the Royal Northern Hospital, London; formerly Physician and Honorary Pathologist to the Mount Vernon Hospital for Consumption and Diseases of the Chest, Lecturer of Polygraphic Methods at the Medical Graduates' College and Polyclinic, and Examiner in Medicine at the University of St. Andrews. 534 pages, illustrated. New York: Oxford University Press. Cloth, $6.20.

Price is a disciple of Mackenzie and shows the influence of Sir James throughout the book. It is with interest that the reviewer notes mention of large dosage

of digitalis as practiced in America. The author also regrets that the x-ray is not used so frequently in England as in the States for cardiovascular examinations.

The sections devoted to endocarditis, myocarditis and pericarditis are well presented. The space allotted to coronary occlusion is so small that it cannot adequately cover the subject.

The sections on polygraphic and electrocardiographic diagnosis are valuable, and the pages devoted to x-ray diagnosis are a real addition to the book.

A section on quinidine therapy has been added. There is a note of fairness throughout the work, and credit is given irrespective of nationality.

Basal Metabolism in Health and Disease. By Eugene F. DuBois, M.D., Medical Director, Russell Sage Institute of Pathology; Associate Professor of Medicine, Cornell University Medical College, New York. Second Edition, thoroughly revised. 431 pages, illustrated with 92 engravings. Philadelphia: Lea & Febiger. Cloth, $5.00.

One follows with pleasure the author's simple presentation of this difficult subject. The place which DuBois holds in the medical profession assures the reader in advance that the book is an authoritative statement of present day knowledge.

At a time like this when the mails are flooded with literature on basal metabolism, its ease of determination and exactness of diagnosis, it is with thankfulness that one reads DuBois' warning: "God forbid that we should make our diagnosis by machinery." Throughout the book the importance of making a diagnosis only on complete data is stressed as against placing absolute reliance upon mechanical methods.

There is always a presentation of both sides of a disputed question, and the extensive index of authors is a real asset. DuBois shows basal metabolism as something more than a mechanical method to be turned over to a technician who has added it to her other rule-of-thumb duties.

Tuberculosis of the Lungs. By H. Hyslop Thompson, M.D., D.P.H., County Medical Officer of Health and County Tuberculosis Officer for Hertfordshire; formerly Tuberculosis Officer for Newport and East Monmouthshire; Medical Superintendent, Liverpool Sanatorium and Medical Superintendent, Consumption Sanatorium of Scotland, Bridge of Weir, and A. P. Ford, M.R.C.S., L.R.C.P., D.P.H., Clinical Tuberculosis Officer and Deputy County Medical Officer of Health for Hertfordshire. New York: William Wood & Co. Cloth, $4.00.

The book is written for British physicians practicing where state medicine is in force, and contains constant references to the laws and regulations governing the status of patients.

It seems rather strange that in the section devoted to the history of tuberculosis there is no mention of Trudeau. Too limited space has been allowed each phase of the subject, and clearness has been sacrificed to brevity. Under treatment there is more polypharmacy than the American physician is accustomed to employ.

As a manual upon so important a subject as pulmonary tuberculosis, Dr. Thompson's work seems inadequate.

Medical Science for Everyday Use. By Shields Warren, A.B., M.D., Pathologist, Palmer Memorial Hospital, Boston, Mass. 178 pages. Philadelphia: Lea & Febiger. Cloth, $2.00.

Written for the layman, the book has much merit. The author has been careful not to be too technical, but at the same time has fully covered the subjects. Treatment has been intentionally omitted, and the reader is wisely cautioned against "self-diagnosis."

Manual of Medicine. By A. S. Woodwark, C.M.G., C.B.E., M.D., F.R.C.P., Physician, Lecturer on Medicine and Dean of the Medical School, Westminster Hospital; Senior Physician to the Royal Waterloo Hospital for Children and Women; Physician to the Miller General Hospital for Southeast London; Examiner in Medicine to Society of Apothecaries and General Nursing Council; late Colonel A.M.S., Consulting Physician to the Forces and Deputy Assistant Director-General; Casualty Physician to St. Bartholomew's Hospital; Extramural Lecturer to London School of Clinical Medicine; Medical Tutor and Senior Medical Registrar to King's College Hospital, and Senior Resident Medical Officer, Royal Free Hospital. Third edition. 523 pages, illustrated. New York: Oxford University Press, Cloth, $4.75.

In this condensed practice of medicine the field has been on the whole well covered, and recent methods have been added. The section on treatment of cardiac vascular diseases is not definite enough. There is no mention of the treatment by diet in pernicious anemia. The treatment of lobar pneumonia is not modern, since the author advises control of hyperpyrexia with drugs, as well as hydrotherapy.

The section given to insanity is too brief to be clear. For the better educated physician there is little need of a book of this scope.

The Elements of General Zoology. By William J. Dakin, D.Sc., F.Z.S., Professor of Zoology in the University of Liverpool. 496 pages. London and New York: Oxford University Press. Cloth, $4.00.

This text can be warmly recommended for those starting the study of general zoology.

Diseases of the Digestive Organs, with Special Reference to Their Diagnosis and Treatment. By Charles D. Aaron, Sc.D., M.D., F.A.C.P., Professor of Gastro-Enterology and Dietetics in the Detroit College of Medicine and Surgery; Professor of Gastro-Enterology in the Detroit Post-Graduate School of Medicine; Consulting Gastro-Enterologist to Harper Hospital. Fourth edition. Thoroughly revised. 927 pages, illustrated with 174 engravings, 80 roentgenograms and 13 colored plates. Philadelphia: Lea & Febiger. Cloth, $11.00.

Extensive revision of this edition has included the newer methods in diagnosis. The sections given to examination of the stomach contents, examination of feces and roentgen ray examination of the gastro-intestinal tract are very complete. The author always includes accepted methods other than those which he prefers and uses personally.

One criticism that can be made is that in the sections on treatment too many proprietary drugs are mentioned.

Ultra-Violet Radiation and Actinotherapy. By Eleanor H. Russell, M.D., B.S., Dunelm, and W. Kerr Russell, M.D., B.S., Dunelm, Hon. Actinotherapist Sun-Ray Clinic, Newcastle-on-Tyne; Goyder Scholar, University, Durham, 1914; late Captain R.A.M.C. (S.R.); late Surgeon, Special Military Surgical Orthopedic Hospital, Newcastle; late Surgeon, War Pensions Hospital, Castle Leazes, Newcastle-on-Tyne. Second edition. 428 pages, illustrated. New York: William Wood & Co. Cloth, $5.00.

The discussion of the physics of radiant energy is clear and sufficiently full, as are also the chapters devoted to the consideration of solar and artificial ultra-violet radiation, and the different types of lamps.

The sections on chemical and physical properties of the ultra-violet ray show the knowledge gained from careful study, as well as from experience. In the chapter devoted to the biological effects of ultra-violet radiation no opinions are expressed without data to justify them. The space given to technic is a model of clearness.

The conditions in which ultra-violet radiation may be used to advantage alone or with other treatment are covered fully and without exaggeration. The bibliography appended is international in character.

Careful study of this book will repay any physician.

Tuberculosis. Bacteriology, Pathology and Laboratory Diagnosis. By Edward R. Baldwin, M.D., Director of the Trudeau Foundation; S. A. Petroff, Ph.D., Bacteriologist and Director of Trudeau Sanatorium Research and Clinical Laboratory; and Leroy S. Gardner, M.D., Pathologist and Director of Saranac Laboratory for the Study of Tuberculosis, Saranac Lake, N. Y. 342 pages, illustrated with 82 engravings and 4 colored plates. Philadelphia: Lea & Febiger. Cloth, $4.50.

On account of the wide experience of its authors, the reading of this work is anticipated with pleasure, and the reader is not disappointed. Although it is technical in character, it is clear, and will be welcomed by those interested in the modern study of tuberculosis.

History of Cardiology. By Louis Faugeres Bishop, M.A., M.D., Sc.D., F.A.C.P., President, Medical Association of Greater City of New York; late Chairman, Section on Historical and Cultural Medicine, New York Academy of Medicine; formerly Professor of Diseases of the Heart, Fordham Medical School, New York City; Consultant in Diseases of the Heart, Lincoln Hospital, New York, and John Neilson, Jr., B.S., M.D., Assistant in the Cardiac Clinic, St. Luke's Hospital, New York. 71 pages. New York: Medical Life Press. Cloth, $5.00.

This book is a mere outline of the subject, and does not picture the development of cardiology. The inclusion of Theodore Schott with Groedel and Mackenzie in the lists of those who made modern cardiology is surprising, despite the reasons given by the author. It seems strange, when Sir James Mackenzie's real life-work was in stressing the importance of the myocardium and its involvement in cardiac disease and the evaluation of subjective symptoms in heart disease, that he should be credited with showing the real significance of auricular fibrillation. This latter was only determined by electrocardiographic study of the condition.

It is to be hoped that another history of cardiology will appear, for the present volume does not do justice to the subject.

The Psycho-Pathology of Tuberculosis. By D. G. Macleod Munro, M.D., C.M., M.R.C.P. (Ed.). 92 pages. New York: Oxford University Press. Cloth, $1.75.

The historical characters who were subjects of tuberculosis are here interestingly presented. The little book is a good presentation of something that most physicians have observed, but have never been able to formulate in words. The section on treatment of the condition is especially worth reading.

Elements of Hygiene and Public Health. An Introduction to Preventive Medicine for Students and Practitioners of Medicine. By Charles Porter, M.D., B.Sc., M.R.C.P. (Edin.), of the Middle Temple, Barrister-at-Law; Medical Officer of Health, Metropolitan Borough of St. Marylebone; Lecturer in Public Health, Middlesex Hospital, Medical School; Member of Board of Examiners, Royal Sanitary Institute; formerly Tutor in Public Health, St. Bartholomew's Hospital, etc. Second edition. 425 pages, with 98 illustrations. New York: Oxford University Press. Cloth, $4.50.

This manual states in a very readable manner the essential facts of hygiene and public health. Written by a British author, the laws described are naturally of that nation, but the principles and manner of application are sound.

For one wishing to obtain definite information, it is recommended as a good working guide.

Dyspepsia: Its Varieties and Treatment. By W. Soltau Fenwick, M.D., B.S. (London), late Physician to the Evelina Hospital for Sick Children, London. Second edition, Revised. Octavo of 515 pages, illustrated. Philadelphia and London: W. B. Saunders Company. Cloth, $6.00 net.

The subject in general is well covered, and methods of investigation, with differential diagnosis, prognosis and treatment, are good. The sections on treatment, written by a British physician, at times differ from those used in America. The chapter upon "dyspepsia due to the presence of foreign bodies and living creatures in the stomach" seems out of place in a book of this character, and at times it is fanciful. Despite the publication of the book in 1925, there is no bibliographical reference later than 1909.

The Specialties in General Practice. Compiled by Francis W. Palfrey, M.D., Instructor in Medicine at Harvard University, in collaboration with fourteen other teachers of Harvard Medical School. Octavo of 748 pages. Philadelphia and London: W. B. Saunders Company, 1927. Cloth, $6.50 net.

This book is not intended to take the place of treatises on the different specialties, but is a reference book. In collaboration with other members of the faculty of Harvard University from the departments of dermatology, genito-urinary surgery, gynecology, rhinology and laryngology, obstetrics, ophthalmology, orthopedic surgery, otology, pediatrics, psychiatry, Dr. Palfrey has made a very satisfactory compilation. He is wisely careful to warn the physician against attempting treatment of cases for which he has not had the necessary training.

Obstetrics for Nurses. By Joseph B. DeLee, M.D., Professor of Obstetrics at the Northwestern University Medical School; Obstetrician to the Chicago Lying-In Hospital and Dispensary. New (8th) edition, Revised. 12 mo. of 635 pages, with 266 illustrations. Philadelphia and London: W. B. Saunders Company, 1927. Cloth, $3.00 net.

Written by one of the leading obstetricians of America, a physician of international reputation, the book is one that will naturally attract attention. In writing for nurses the author has given as good a volume as is his *"Practice of Obstetrics"* for the physician. It is a perfect example of an elementary text-book.

Diet in Health and Disease. By Julius Friedenwald, M.D., Professor of Gastro-Enterology in the University of Maryland School of Medicine, Baltimore; and John Ruhrah, M.D., Professor of Diseases of Children in the University of Maryland, Baltimore. Sixth edition, thoroughly revised. Octavo of 987 pages. Philadelphia and London: W. B. Saunders Company. Cloth, $8.00 net.

This book has long been accepted as a standard by the medical profession. In the sixth edition there has been extensive revision of the text. The section upon the physiology of digestion has been rewritten and that on diabetes revised in large part. The book is written for practical use, and as a practical work will continue to hold the esteem of its readers.

Practical Dietetics for Adults and Children in Health and Disease. By Sanford Blum, A.B., M.S., M.D., Head of Department of Pediatrics, and Director of the Research Laboratory, San Francisco Polyclinic and Post-Graduate School. Second revised edition. 362 pages. Philadelphia: F. A. Davis Company. Cloth, $4.00.

The name of this volume, "Practical Dietetics in Health and Disease," is a misnomer, for it is simply a list of foods and drinks which the author considers indicated and contra-indicated in different conditions. There is no caloric estimation of any of the diets, and the quantities to be taken are never mentioned. Under diabetes there is no reference to insulin.

The diets mentioned under heart disease are not in conformity with modern practice.

The author omits all of the accepted diets in peptic ulcer, and the directions given with the diets mentioned are not clear.

The book is not fitted for the purpose for which it was written.

Diabetes; Its Treatment by Insulin and Diet. A Handbook for the Patient. By Orlando H. Petty, A.M., M.D., F.A.C.P., Professor of Diseases of Metabolism, Graduate School of Medicine, University of Pennsylvania; Physician in Charge of Departments of Diseases of Metabolism, Hospitals of the Graduate School of Medicine, University of Pennsylvania; Philadelphia General Hospital, and Roxborough Memorial Hospital; Visiting Physician, Roxborough Memorial Hospital; and William H. Stoner, A.M., M.D., F.A.C.P., Associate Professor of Biochemistry, Graduate School of Medicine, University of Pennsylvania; Assistant Visiting Biochemist, Philadelphia General Hospital; Assistant Metabolic Physician, Hospitals of the Graduate School of Medicine, University of Pennsylvania, and Philadelphia General Hospital. 133 pages, with illustrations and tables. Philadelphia: F. A. Davis Company, 1925. Cloth, $1.50 net.

This handbook is clear and full. The sections devoted to diet are complete. The chapter on "Diabetic Hygiene" should have gone into more detail. The section on insulin is well presented.

The Pathology and Treatment of Diabetes Mellitus. By George Graham, M.A., M.D., F.R.C.P., Assistant Physician, St. Bartholomew's Hospital. Second edition. 230 pages. New York: Oxford University Press. Cloth, $2.75.

It is with pleasure that a book of this kind is reviewed, and with satisfaction that one notes that the author is not "writing down" to his readers, but that he is trying to present his subject in a scientific manner.

The section on treatment is interesting, and if it differs at times from the usual methods, at least the author's advice is worthy of a trial.

Much has been written on diabetes from the clinical viewpoint. Dr. Graham covers the pathological side of the question.

Diabetic Diet: A Handbook for the Diabetics. By A. Doris McHenry, B.A., and Marjorie M. Cooper, B.A., with a Preface by J. A. Gilchrist, B.A., M.D., and F. G. Banting, M.C., M.B., M.R.C.S., F.R.C.P., M.D., D.Sc., LL.D. Harper & Brothers, Publisher. New York and London.

The outpatient dietary at the Christie Street Hospital is of value. The diversity of recipes should make it of real service.

Southern Medical News

ALABAMA

Construction has begun on the annex to Hillman Hospital, Birmingham, at an approximate cost of $450,000, and providing 200 additional beds.

Miss Mary Lou Jennings, Birmingham, formerly with the Children's Hospital, has accepted a position as nurse at St. Michael's Clinic, Anniston, a charity institution supported by public contributions.

Miss Ruth I. Strine, formerly of the Maryland Tuberculosis Sanatorium, State Sanatorium, is the new Superintendent of the Etowah County Tuberculosis Sanatorium, Gadsden.

Deaths

Dr. W. L. Stringer, Falkville, aged 46, died April 26 following a short illness.

ARKANSAS

The Arkansas Tuberculosis Association held its annual meeting in Little Rock March 31.

The following counties have never organized a medical society in the State: Fulton, Izard, Sharp, Pike, Newton, Stone, Van Buren and Poinsett.

The corner-stone has been laid for the new St. Joseph's Sanitarium, Hot Springs.

Dr. L. T. Brown, Superintendent of the State Hospital for Nervous Diseases, has been reappointed for a term of four years. Other appointments are: Dr. E. T. Ponder, Little Rock, Physician at the State Farm for Women; Dr. J. C. Cunningham, Little Rock, Physician at the Girls' Training School near Alexander; Dr. S. W. Colquitt, Grady, Physician at the Boys' Industrial School, Pine Bluff.

Dr. C. M. Brooks, formerly with the Pulaski County Hospital, has been appointed Superintendent of the General Hospital, Little Rock.

Dr. J. R. Linzy has resigned his position as Physician at the Arkansas Confederate Home and has opened offices in North Little Rock.

DISTRICT OF COLUMBIA

The Washington Medical and Surgical Society held its annual banquet April 7, and in accordance with custom conferred honorary membership on outstanding members of the profession, among whom were Dr. Ross H. Skillern, Philadelphia, Pa., and Dr. Coursen B. Conklin, Secretary of the Medical Society of the District of Columbia.

The District Health Department is planning to conduct a city wide campaign of immunization against diphtheria this summer.

Deaths

Dr. Ralph Jenkins, Washington, aged 61, died February 9 of coronary thrombosis.

Dr. John Hepburn Yarnell, Washington, aged 70, died March 9 of mitral regurgitation.

FLORIDA

The Florida State Medical Association, at its annual meeting in West Palm Beach April 5-6, elected Dr. John A. Simmons, Miami, President; Drs. William E. Van Landingham, West Palm Beach, Frederick J. Bowen, Jacksonville, and John E. Hall, West Palm Beach, Vice-Presidents; Dr. Shaler A. Richardson, Jacksonville, Secretary-Treasurer.

Plans have been accepted for the proposed Scenic Highlands Hospital and Sanitarium which is to be constructed at Winterhaven, funds for which are now being raised.

A hospital is being erected on a built-up island at Miami Beach, at an approximate cost of $2,000,000, by James A. Allison, Indianapolis, Ind.

Dr. C. H. Farmer has been appointed City Health Officer for Lakeland.

Dr. W. E. Van Landingham has been appointed City Health Officer for West Palm Beach.

Dr. Allen M. Ames and Miss Faye Jernigan were married in Pensacola February 23.

Deaths

Dr. Joseph Yates Porter, Sr., Key West, aged 79, died March 16 of aortic insufficiency.

Dr. Edwin Van Deusen Gazzam, Clearwater, aged 61, died March 15 of cerebral hemorrhage.

Dr. Clancy Montague Jackson, Jacksonville, aged 34, was killed March 11 by an unknown assailant.

GEORGIA

Brooks County Medical Society has elected Dr. T. R. Moye, Quitman, President; Dr. R. E. McClure, Quitman, Secretary-Treasurer.

Butts County Medical Society has elected Dr. A. F. White, Flovilla, President; Dr. B. F. Akin, Jenkinsburg, Vice-President; Dr. J. Lee Byron, Jackson, Secretary-Treasurer.

Cobb County Medical Society has elected Dr. J. E. Lester, Marietta, President; Dr. L. G. Garrett, Austell, Vice-President; Dr. R. W. Fowler, Marietta, Secretary-Treasurer.

Coffee County Medical Society has elected Dr. Geo. M. Ricketson, Broxton, President; Dr. D. H. Meeks, Nichols, Vice-President; Dr. T. H. Clark, Douglas, Secretary-Treasurer.

DeKalb County Medical Society has elected Dr. J. F. Schneider, East Lake, Decatur, President; Dr. J. R. Evans, Decatur, Vice-President; Dr. G. A. Duncan, Decatur, Secretary-Treasurer.

Greene County Medical Society has elected Dr. Goodwin Gheesling, Greensboro, Secretary-Treasurer.

Gwinnett County Medical Society has elected Dr. N. H. Pierce, Suwanee, President; Dr. Chalmers Hinton, Lawrenceville, Vice-President; Dr. D. C. Kelley, Lawrenceville, Secretary-Treasurer.

Jenkins County Medical Society has elected Dr. M. E. Perkins, Millen, President; Dr. Q. A. Mulkey, Millen, Vice-President; Dr. C. Thompson, Millen, Secretary-Treasurer.

Johnson County Medical Society has elected Dr. T. L. Harris, Wrightsville, President; Dr. J. C. Brantley, Wrightsville, Secretary-Treasurer.

Mitchell County Medical Society has elected Dr. J. K. Brown, Camilla, President; Dr. J. A. Summerlin, Pelham, Vice-President; Dr. C. A. Stevenson, Camilla, Secretary-Treasurer.

Ocmulgee County Medical Society has elected Dr. A. L. Smith, Cochran, President; Dr. E. C. Brown, Hawkinsville, Vice-President; Dr. Albert R. Bush, Hawkinsville, Secretary-Treasurer.

Upson County Medical Society has elected Dr. B. C. Adams, Thomaston, President; Dr. C. A. Harris, The Rock, Vice-President; Dr. R. L. Carter, Thomaston, Secretary-Treasurer.

At the annual meeting of the State Board of Health Mr. Robert F. Maddox, Atlanta, was re-elected President, and Dr. James H. McDuffie re-elected Vice-President.

The new sanatorium at Alto was opened March 1. It is a $500,000 structure, and has just been completed. The old and new buildings have a total capacity of about three hundred beds, while the funds available are only sufficient to care for about one hundred. Dr. T. F. Abercrombie will ask the Legislature for an appropriation of $250,000.

A contract has been awarded for the construction of the new hospital owned by Drs. J. F. Mixson and Frank Bird, Valdosta.

The Samaritan Hospital for colored people, Rome, was reopened March 1. The institution has been closed for several months on account of the inability of the colored people to raise sufficient funds to maintain it.

Drs. H. J. Carswell, D. M. Bradley, C. M. Stephens, W. F. Reavis and G. E. Atwood, Waycross, have been appointed as a committee to investigate the most satisfactory method for raising $75,000 for hospital purposes and report to the City Commission.

Dr. George Bachman, Professor of Physiology at Emory University, has been appointed on the committee of judges to pass upon research work in medicine presented by members of the Medical Association of Georgia in competition for the Crawford W. Long memorial prize.

Dr. H. G. Hollingsworth, Meigs, has accepted a position with the Atlantic Coast Line Railroad, and has removed to Waycross.

Drs. Charles D. Ward and C. W. Churchill, Augusta, have been appointed Physical Medical Examiners for the United States Marine Corps.

Dr. Shelley C. Davis, Atlanta, has sailed for Paris, France, to serve a year in the American Hospital.

Miss Olive Whitfield, State Board of Health field nurse, has spent several weeks in McIntosh County in an effort to improve health conditions as outlined in the Sheppard-Towner Health Law.

Miss Lillian Kennedy, Atlanta, a medical artist, will devote her time to making drawings illustrating operations done at Davis-Fischer Sanatorium without any cost to the surgeon.

Dr. R. E. McClure, Quitman, Health Officer for Brooks County, announces a schedule of visits to the public schools of Brooks County to give typhoid vaccine.

Dr. W. F. Wells has been elected Grand High Priest of the Royal Arch Masons of Georgia.

Deaths

Dr. William T. Brown, aged 76, died April 2.

Dr. Thomas Goodwin Gauntt, West Point, aged 44, died March 27 of Landry's paralysis.

Dr. Custer B. Manning, Lovett, aged 46, died March 6 at the Claxton-Montford Hospital, Dublin, of uremia and chronic nephritis.

Dr. John Calhoun Beauchamp, Williamson, aged 75, died April 4.

KENTUCKY

Franklin County Medical Society has elected Dr. T. M. Travis, President; Dr. C. E. Youmans, Vice-President; Dr. Flora W. Mastin, Secretary-Treasurer.

Fulton County Medical Society has elected Dr. J. C. Morrison, Hickman, President; Dr. Henry Alexander, Fulton, Vice-President; Dr. H. E. Prather, Hickman, Secretary-Treasurer.

Grant County Medical Society has elected Dr. Chas. D. O'Hara, Williamson, President; Dr. John G. Rencher, Dry Ridge, Vice-President; Dr. H. F. Mann, Crittenden, Secretary-Treasurer.

Hardin County Medical Society has elected Dr. H. R. Nusz, President; Dr. W. F. Alvey, Vice-President; Dr. D. E. McClure, Secretary-Treasurer.

Simpson County Medical Society has elected Dr. E. K. Lamb, President; Dr. J. T. Carman, Vice-President; Dr. N. C. Witt, Secretary-Treasurer.

(Continued on page 33)

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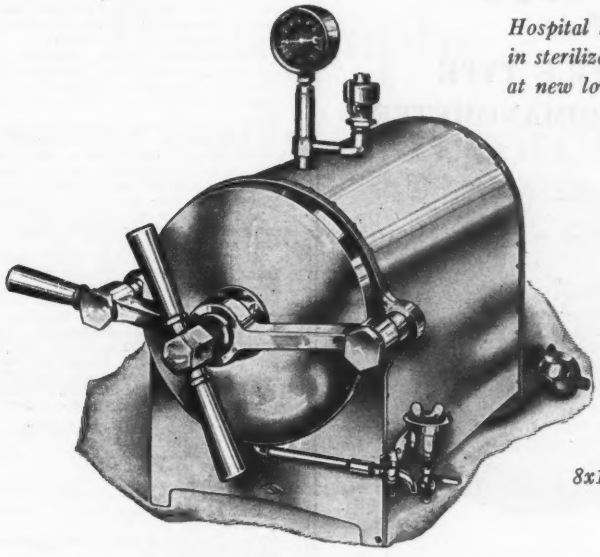

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(Continued from page 500)

Warren County Medical Society has elected Dr. A. D. Donnelly, President; Dr. Roy Newman, Vice-President; Dr. Hal Neel, Secretary-Treasurer.

The Woman's Auxiliary of Russell County Medical Society has been organized. The following officers were elected: Mrs. Ada Tartar, Russell Springs, President; Mrs. M. M. Lawrence, Rowena, and Mrs. J. S. Rowe, Jamestown, Vice-Presidents; Mrs. W. G. Flanigan, Jamestown, Secretary.

Cumberland Valley Medical Society, composed of the county societies of Harlan, Bell, Knox, Laurel and Whitley, has been organized. Dr. William M. Martin, Harlan, Councilor of the Eleventh District, is President.

At the meeting of the Hardin County Medical Society February 10 an amendment to the by-laws was offered to be voted on at the March meeting, providing that no physician in the county who had not attended at least two regular meetings of the County Medical Society should be eligible for membership.

A $100,000 wing will be added to the Good Samaritan Hospital, Lexington, which will provide thirty-five additional beds.

A new whole-time health unit was established at Henderson May 1. There are two public health nurses, a sanitary inspector, a technician and a whole-time health officer. Under the new plan, the present County Health Officer and the City Health Officer's positions will be abolished. The State will provide $2,500; the city, $2,500; the county, $2,500, and the International Health Board of the Rockefeller Foundation, $2,500, to carry on this work.

Miss Amelia K. Collins has resigned as Superintendent of the Paintsville Hospital.

Deaths

Dr. William August Keller, Louisville, aged 59, died March 18 of angina pectoris.

Dr. Eugene Ferris Beard, Lexington, aged 74, died March 21 of heart disease.

Dr. T. D. Bryan, Fulton, aged 74, died March 25 of a carbuncle on the neck.

Dr. Charles Rothe Rice, Augusta, aged 45, died suddenly March 12.

Dr. George F. Mitchell, Beaver Dam, aged 83, died March 18 of bronchitis.

LOUISIANA

St. Marvin Parish Medical Society has elected Dr. S. D. Yongue, Breaux Bridge, President; Dr. M. Boudreau, Breaux Bridge, Vice-President; Dr. P. H. Fleming, St. Martinville, Secretary-Treasurer.

Seventh District Medical Society has elected Dr. Thomas H. Watkins, Lake Charles, President.

Sixth District Medical Society has elected Dr. A. G. Maylie, President; Drs. A. W. Martin, Ascension Parish; T. J. McHugh, East Baton Rouge Parish; E. M. Toler, East Feliciana Parish; B. O. LeBlanc, Iberville Parish; J. A. Thorn, Livingston Parish; M. O. Becnel, Pointe Coupee Parish; H. A. Tynes, St. Helena Parish; S. R. Young, St. Tammany Parish; Lucius McGehee, Tangipahoa Parish; J. H. Slaughter, Washington Parish; J. A. St. Dizier, West Baton Rouge Parish; A. F. Barrow, West Feliciana Parish, Vice-Presidents; Dr. T. C. Paulsen, Baton Rouge, re-elected Secretary-Treasurer.

Vermillion Parish Medical Society has elected Dr. G. L. Gardiner, Gueydan, President; Dr. A. A. Comeaux, Abbeville, Vice-President; Dr. Thomas Latiolais, Kaplan, Secretary-Treasurer.

A State conference for social betterment was held at New Orleans March 15-19. There was an institute of five sessions organized by a special committee for registrants interested in case work, and a series of joint conferences with various allied agencies and groups.

Tulane University has installed a new academic medical course, effective next fall. This will prescribe three years of scientific work in the College of Arts and one in the medical school for a degree of Bachelor of Science. The new course is practically the same as the one now in force, except at present two years of work in the premedical sciences and two years in the medical school is required. Instead of calculus, which is required now, a year of physics will be required and three years of chemistry and two of biology.

(Continued on page 36)

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Medical Division Rochester, N. Y.

(Continued from page 34)

A new home for orphan babies was opened in New Orleans March 26. It will be supported by contributions from the Protestant churches of the City, and will accommodate fifty babies under three years of age. The building contains a hospital room, kitchen, sleeping rooms, nurses' quarters, playroom, and sewing room and parlors. This is the third institution maintained for infants in New Orleans. The others are the St. Vincent Asylum, which cares for nearly 300 babies, and the King's Daughters' Nursery.

Dr. P. Graffagnino, New Orleans, has been appointed Chief of the Surgical Staff of the French Hospital.

Dr. Edmond Landry, New Orleans, succeeds the late Dr. M. F. Morvant as coroner.

Dr. Joseph Aloysius La Nasa and Miss Leola Dalton, both of New Orleans, were married January 8.

Deaths

Dr. Edmond Moss, New Orleans, aged 54, died March 22 of myocarditis.

Dr. Joseph Edgar Johnson, Gandy, aged 49, died November 11 at Houston, Tex., of acute appendicitis.

Dr. Ladislas Lazaro, Washington, aged 54, died March 30 at the Garfield Hospital, Washington, D. C., of inguinal hernia.

Dr. Philip William Bohne, New Orleans, aged 46, died March 31 of Hodgkin's disease.

MARYLAND

Cumberland conducted its third annual public health meeting March 22. There was a joint meeting of the Rotary, Kiwanis and Monarch Clubs at noon; the regular meeting of the Allegany-Garrett County Medical Society in the afternoon, and a public health meeting in the evening.

Deputy State health officers from all parts of the State conferred April 8 with the Chief of the Bureau of Communicable Diseases, Dr. Robert H. Riley, concerning tourists' camps and inspection work around canneries. The State Board of Health is formulating rules on all kinds of camps in which there are more than five persons, after which it will be necessary to have a permit from the State Board before a permanent camp can be established.

The Book and Journal Club of the Medical and Chirurgical Faculty of Maryland met in Baltimore April 7.

Under the direction of Dr. Robert H. Riley, of the Bureau of Communicable Diseases, the State Department of Health is surveying the milk supply and methods of handling milk in dairies over the entire State. There has been no epidemic of children's diseases which could be traced directly to milk, but the death rate among infants is too high. The survey will include all larger towns in the counties of Maryland.

At the recent annual meeting of the Medical and Chirurgical Faculty of Maryland, a portrait of the late Dr. Charles Geraldus Hill was presented to the society by Dr. William R. Johnson, and a bust of Dr. George Keidel was presented by Dr. Julius Friedenwald.

The campaign for funds which was conducted by the half-century committee of Johns Hopkins University, Baltimore, closed in December with total contributions of more than $7,000,000 from 3,992 subscriptions.

Miss Mary A. Morris, for the past four years Superintendent of Richard's Hospital, Port Deposit, has resigned to go to Florida.

Dr. William H. Welch, Baltimore, was recently elected Honorary President of the American Social Hygiene Association, succeeding the late Charles W. Eliot.

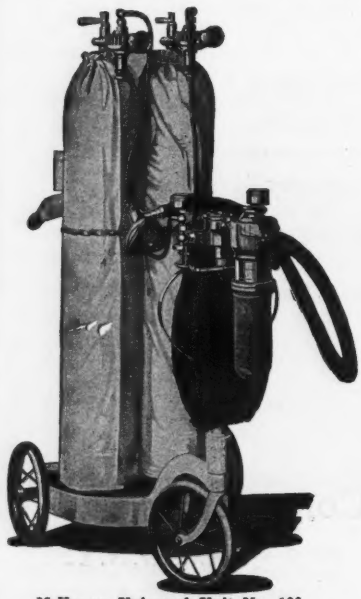
On April 26 Dr. Thomas S. Cullen, Baltimore, President of the Medical and Chirurgical Faculty of Maryland, gave a dinner in honor of the former Presidents of the State Society.

The degree of Doctor of Medicine, Honoris Causa, has been conferred on Dr. John J. Abel, Professor of Pharmacology, Johns Hopkins University Medical Department, Baltimore, by the Faculty of Medicine and Academic Senate of the John Casimir University of Lwow, Poland.

Deaths

Dr. Joseph Abromaitis, Baltimore, aged 59, died March 23 of pneumonia.

(Continued on page 38)



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Why McKesson Apparatus gives a Better Ethylene Narcosis.

Ethylene, like wet nitrous oxid, tends to freeze when administered by the continuous flow method. Every user knows this to be true. Freezing disturbs the proportions, and the depth of anesthesia varies as a result, often requiring the addition of ether to overcome unevenness of anesthesia, which might not be necessary if freezing were prevented.

The McKesson intermittent flow principle prevents freezing by fracturing the ice at the valve nozzle at each breath. This is a clinical advantage that is recognized by all McKesson users who have used continuous flow appliances.

Probably more ethylene is being administered through McKesson appliances than all others.

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2226-36 Ashland Avenue, Toledo, Ohio

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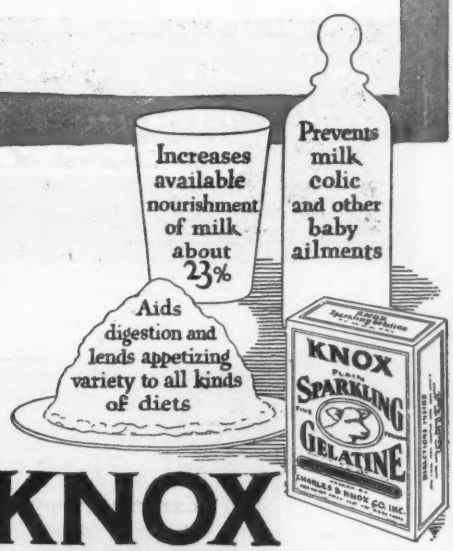
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408 Knox Ave., Johnstown, N. Y.

KNOX
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"The Highest Quality for Health"

(Continued from page 36)

MISSISSIPPI

Clarksdale and Six Counties Medical Society has elected Dr. J. A. Slack, Friars Point, President; Dr. R. R. Kirkpatrick, Clarksdale, Secretary.

The Mississippi State Board of Health will hold its regular annual meeting June 20-22.

The next meeting for the examination for license to practice medicine in the State will be held by the State Board of Health June 21-22 at Jackson.

Pike, Lincoln, Lauderdale and Yazoo Counties are planning full-time health departments to begin January, 1928.

Dr. E. J. Banks, Baldwyn, has become a member of the staff of the Insane Hospital, Jackson.

Dr. W. H. Anderson, Booneville, has been appointed County Health Officer, to succeed Dr. E. J. Banks.

Dr. T. P. Haney, Jr., Montgomery, Ala., succeeds Dr. F. T. Carmack as County Health Officer of Tishomingo County.

Deaths

Dr. Harry G. Fridge, Denco, aged 48, was accidentally killed March 21 when his automobile was wrecked against a tree.

Dr. Furtunato Bottista Sirianni, Greenville, aged 52, died March 1.

Dr. Samuel Milton Rainey, Starkville, aged 77, died in March of dilatation of the heart.

Dr. W. H. A. Bemis, Pope, aged 75, died March 4 of paralysis.

MISSOURI

Bates County Medical Society has elected Dr. H. W. Insley, Rich Hill, President; Dr. G. H. Thiele, Butler, Secretary-Treasurer.

Caldwell County Medical Society has elected Dr. G. S. Dowell, President; Dr. Tinsley Brown, Secretary-Treasurer.

Christian County Medical Society has elected Dr. J. C. Young, Ozark, President; Dr. J. H. Wade, Ozark, Vice-President; Dr. F. H. Brown, Billings, Secretary-Treasurer.

Cooper County Medical Society has elected Dr. A. L. Meredith, Prairie Home, President; Dr. H. D. Quigg, Boonville, Vice-President; Dr. W. E. Stone, Boonville, Secretary.

Dunklin County Medical Society has elected Dr. Paul Baldwin, Kennett, President; Dr. S. T. Smith, Holcomb, Vice-President; Dr. T. J. Rigdon, Kennett, Secretary-Treasurer.

The Missouri-Kansas Neuropsychiatric Society met at the University Club, Kansas City, February 16.

On April 3 there was a large assembly at the U. S. Veterans' Hospital, Jefferson Barracks, to observe Arbor Day and the planting of thirty-three elms. The ceremony was participated in by the American Legion, Spanish-American War Veterans and the Municipal Council of Veterans.

A mental hygiene conference was held at St. Louis April 4-5, under the auspices of the Missouri Mental Hygiene Society.

The Franklin County Medical Society is co-operating with the State Board of Health and the local health authorities at Washington to clear up an outbreak of smallpox, which up to March 26 had amounted to 197 cases.

The St. Louis Medical Society has taken cognizance of the smoke problem in St. Louis following a meeting at which the subject was discussed. The following committee has been appointed: Drs. E. C. Funsch, Chairman; C. H. Shutt, F. S. Haeberle, George J. Epp, C. E. Coffee, E. A. Babler, F. J. V. Krebs, T. P. Brooks, Frances Bishop and Sam T. Bassett.

The erection of a county hospital at Louisiana has been made possible through the merging of two funds, one fund established by the late Susanneli Barr amounting to $25,000, and the other left by the late Otis Smith, New York, amounting to $100,000, both funds being established for the purpose of erecting a hospital at Louisiana. The building will be a fifty-bed hospital and will cost $140,000. When it is completed and equipped the hospital will be turned over to Pike County for maintenance.

(Continued on page 40)

For lubricating all instruments of penetration—
K-Y LUBRICATING JELLY
"The Cleanest of Lubricants"

For Tired Aching Heads —
JOHNSON'S ANALGESIC
"Externally applied, relief without harmful reaction"
FOR SALE AT DRUG STORES
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And to Those Who Have Not Yet Joined the Ranks of Baumanometer Boosters:

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It has *no cemented joints.*

It *does not* leak mercury.

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It has a new, distant-reading scale that eliminates parallax and other errors-of-method. It is unbreakable and *permanently* good-looking.

The ***Cartridge Tube*** is individually calibrated, accurately interchangeable, and is *guaranteed against breakage for your lifetime.*

It is *convenient* and *easy* to operate because it is one compact, self-contained unit. There is no putting together, then taking it apart every time you use it.

These *exclusive* features mean: No Factory Repairs, and practically No Upkeep Cost.

Above all, it's a BAUMANOMETER—a scientific instrument that for eleven years *has* proved worthy of confidence, and that *does* look the part.

An Important Message to 50,000 Users of Old-Style Baumanometers

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In thus meeting your wishes, however, the number who can be accommodated is necessarily limited. *No further exchanges will be made after these 5,000* ***Lifetimes*** *have been spoken for.*

Applications will be taken care of in the order they are received.

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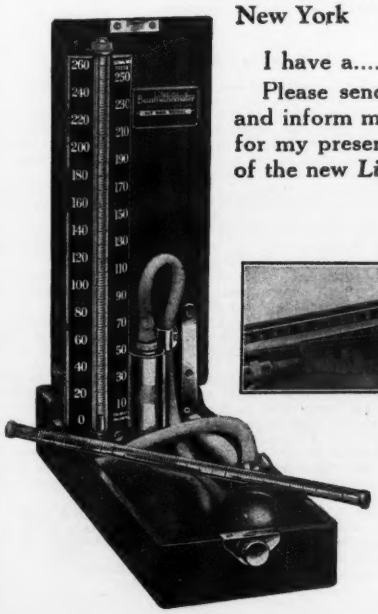

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—removed by a simple pressure of the thumb,

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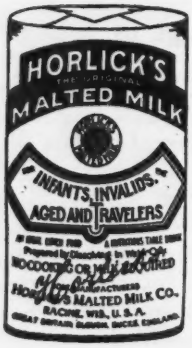

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Our Cultures are at your service as in past years and you will find them of value in this work.

Ask your druggist!

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Yonkers, New York

(Continued from page 38)

There will be erected a four-story Radiologic Institute on the campus of Washington University School of Medicine, St. Louis, which will serve the affiliated hospitals of the School and be connected with them by corridors. The institutions served will be Barnes Hospital, St. Louis Children's Hospital, St. Louis Maternity Hospital, Washington University Dispensary, and, when completed, the MacMillan Eye, Ear, Nose and Throat Hospital. The Institute will provide facilities for research in the field of radiology, and will contain roentgen-ray and radium laboratories and treatment rooms. The General Education Board of the Rockefeller Foundation, New York, and the family of Edward Mallinckrodt, St. Louis, have jointly contributed $1,000,000 for the Institute.

Jackson County Medical Society has endorsed the plan of the City Health Officer whereby food handlers would be required to obtain certificates of health. It is planned to establish a municipal clinic for the periodic examination of persons engaged in handling food, where they would be required to register annually for a fee of $1 and submit to physical examination about every three months free of charge. The personnel of the clinic would be one full-time physician, one part-time physician, two nurses, a bacteriologist and clerical help. The estimated cost of establishing it would be about $20,000.

Dr. P. S. Tate, St. Louis, has been appointed First Assistant Physician of State Hospital No. 4, Farmington.

Dr. McKim Marriott, Dean and Professor of Pediatrics of Washington University School of Medicine, St. Louis, has been elected Temporary President of the newly organized Missouri Society for Crippled Children.

Deaths

Dr. A. S. Herndon, Camden Point, aged 64, died March 1 of pneumonia.

Dr. George O. Hammersley, Caruthersville, aged 59, died suddenly in his office March 22 of heart disease.

Dr. Benjamin Homer Bagby, Clarksburg, aged 60, died February 6 of cerebral hemorrhage.

Dr. John Wellington Marsh, Tipton, aged 66, died March 29 as a result of cerebral hemorrhage.

Dr. John Ferguson Brown, St. Louis, aged 63, died suddenly March 22.

Dr. K. S. Piatt, Chillicothe, aged 62, died March 29 at Rochester, Minn.

Dr. Elmo Patton Porterfield, St. Louis, aged 52, died March 4 at Legion, Tex.

Dr. Joseph Adelbert Beebe, Kansas City, aged 49, died March 25 of angina pectoris.

NORTH CAROLINA

Dr. Charles L. Minor, Asheville, after six months in Europe, has returned to his work.

On March 29 the City Physician of High Point reported that 250 cases of measles had been placarded in that city since the epidemic began about five weeks previous, and that there were no signs at that time of abatement.

The Highland Hospital, Asheville, announces the opening of a new building which adds about forty beds to the capacity of the building.

The Good Hope Hospital, Erwin, was damaged by fire early in March to the extent of about $3,000. The patients were safely removed.

Recently citizens of Marion held a mass meeting and designated committees to secure the establishment of a county general hospital.

The bonds available for the development of a county tuberculosis hospital in Wake County have been increased from $100,000 to $250,000 by a recent legislative act.

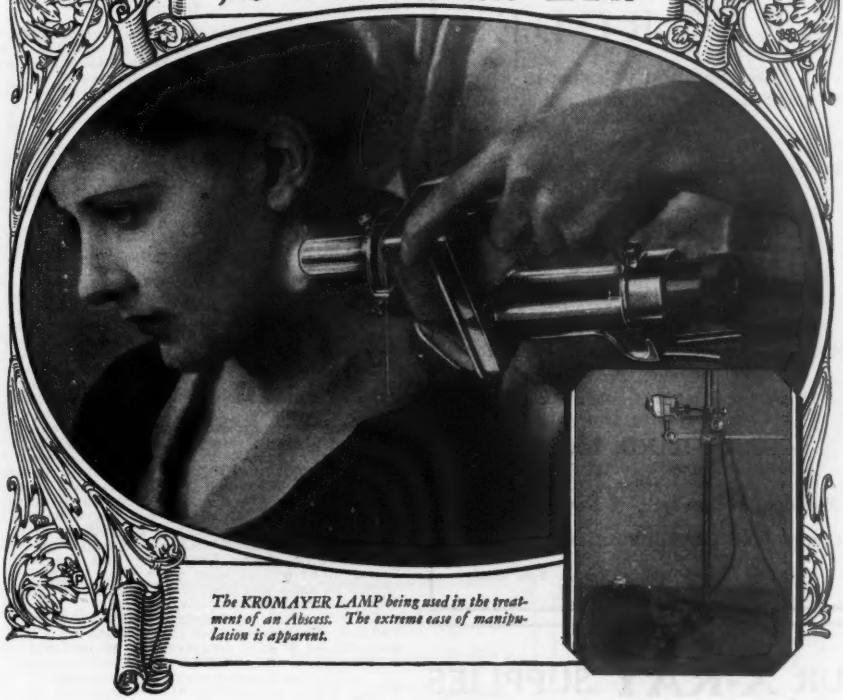
Dr. B. F. McMillan, Red Springs, was presented with a silver loving cup as a testimonial of the affection won by forty-five years of service to medicine at a meeting of the Robeson County Medical Society March 10 at Lumberton.

Dr. Walter E. Storm, Wilmington, was recently honored with a dinner by the staff of Bullock Hospital to celebrate the completion of his fiftieth year in the practice of medicine.

Dr. John P. Monroe has been elected President of the New Charlotte Sanatorium, Charlotte, and Dr. Silas Raymond Thompson has been elected Chairman of the staff.

(Continued on page 42)

The KROMAYER LAMP



The KROMAYER LAMP being used in the treatment of an Abscess. The extreme ease of manipulation is apparent.

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with interchangeable tips—pointed, flat and conical; shaft size 7 F. only.

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CHICAGO

(Continued from page 40)

Dr. Samuel L. Crow, Asheville, and Miss Eunice Elizabeth Mathews, Atlanta, Ga., were married March 19.

Deaths

Dr. Thomas A. Bohannon, Burlington, aged 86, died March 10 as the result of injuries received in a fall.

Dr. Theodore Lafayette Ginn, Goldsboro, aged 47, died March 21 of cerebral hemorrhage.

OKLAHOMA

Dr. Thomas W. Dowdy, of Wilson, Oklahoma, where he has practiced for fifteen years, has moved to Oklahoma City.

The Tri-County Medical Society (Cowley and Sumner, Kansas, and Kay County, Oklahoma) held a meeting at Tonkawa March 16.

A crippled children's clinic was held at Marlow March 10 by Drs. W. K. West, Oklahoma City, and A. M. McMahon, Duncan.

A clinic for crippled children was held at Waurika in March by Dr. S. R. Cunningham, Oklahoma City.

The Governor signed House Bill No. 170, which provides for treatment for crippled children of indigent parents. Any judge may direct the County Superintendent of Health to examine and report on the condition of any child of indigent parents who is suffering from a deformity or malady which may probably be cured, and he may summon other physicians to obtain their opinion. After the reports are filed the court may enter an order for the entrance of the child to the University Hospital, Oklahoma City, for free treatment. Orthopedic cases may be sent to other Oklahoma hospitals if they are willing to accept the compensation provided for in the act. Only orthopedic surgeons who devote at least 60 per cent of their time to that specialty, and who have been passed on by the Faculty of the State University after submitting their qualifications, may qualify for this work. The Faculty of the University and the State Health Department will at least once a year hold free general clinics in each Congressional District to examine children who may be present.

According to the recent ruling of Attorney General Dabney, University Hospital, Oklahoma City, will not be required to give free services to patients sent in by counties, but the counties must pay for such services. He holds that insane cases are charged to the entire State, while others are the concern of the localities sending them for treatment, and that cases of indigent tuberculosis in State institutions must be paid for by the State rather than the counties from which they come.

Dr. W. H. Sisler, Tulsa, announced the establishment of a hospital which will be devoted to the care and treatment of bone and joint diseases. It will be a three-story building.

The City Hospital, Muskogee, was recently sold to the Veterans' Bureau. The city has funds to build, but has not decided on a location.

Dr. J. M. Thompson, Walters, has recently opened a hospital at that place.

Dr. J. E. Harbison, Oklahoma City, was recently appointed Surgeon for the Oklahoma City Railways.

Dr. A. T. Dodson, Hobart, has been elected Health Officer for Kiowa County.

Deaths

Dr. Henry Collins Rogers, Muskogee, aged 60, died April 18 following a short illness.

Dr. Harry McQuown, Red Rock, was shot and instantly killed March 3.

Dr. Anthony Robert Mavity, Marlow, aged 46, died February 5 of heart disease.

Dr. James Alfred Adams, Alma, aged 69, died in March at Duncan of influenza and pneumonia.

Dr. John H. Simmons, Sulphur, aged 70, died March 13.

(Continued on page 44)

CLASSIFIED ADVERTISEMENTS

BECAUSE OF ILLNESS I am compelled to sell my home and give up my practice. Will introduce my patients to purchaser. G. F. W., care Journal.

The Hospital-Fed Baby At Home

Protein Milk

FOR years Protein Milk was a hospital formula; preparation in the home was generally impossible. In 1921, *Merrell-Soule Powdered Protein Milk* changed this. It is easily and correctly prepared by the mother, a proved clinical success, considered as standard by thousands of physicians, and available and used everywhere.

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Based on the original formula. Recognized as the protein milk of choice by the hundreds of pediatrists who have used it continuously for five years. Prepared in home and hospital with equal facility.

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as cow's whole milk in your formulae!

--assures accuracy

--is easy to prepare

--always uniform and pure.

Merrell-Soule Powdered Whole Lactic Acid Milk

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Sold by reliable dealers.

(Continued from page 42)

Dr. Burgess Keaton Wood, Oklahoma City, aged 81, died March 12.

SOUTH CAROLINA

At the annual meeting of the South Carolina State Medical Association, held at Anderson, April 19-21, the following officers were elected: Dr. D. Lesesne Smith, Spartanburg, President; Dr. Waller H. Nardin, Anderson; Dr. William Egleston, Hartsville, and Dr. William R. Barron, Columbia, Vice-Presidents; Dr. Edgar A. Hines, Seneca, re-elected Secretary-Treasurer. This will be the eighteenth year that Dr. Hines has served in this office. Dr. Robert E. Abell, Chester, was re-elected to the State Board of Medical Examiners from the Fifth District, and Dr. Nathaniel B. Heyward, Columbia, was elected to the Board from the Seventh District. The next meeting will be held in Columbia in April, 1928.

TENNESSEE

At the annual meeting of the Tennessee State Medical Association, held in Chattanooga, April 12-14, Dr. William Battle Malone, Memphis, was elected President; Dr. Harrison H. Shoulders, Nashville, full-time Secretary and Editor of the State Medical Journal; Drs. Robert Lyle Motley, Jr., Dyersburg; William W. Porter, Springfield, and George E. Wilson, Rockwood, Vice-Presidents. The next meeting will be held at Nashville.

Bedford County Medical Society has elected Dr. V. K. Earthman, Shelbyville, President; Dr. J. K. Freeman, Bellbuckle, Vice-President; Dr. W. H. Avery, Shelbyville, Secretary-Treasurer.

Bradley County Medical Society has elected Dr. J. F. Gilbert, President; Dr. W. H. Sullivan, Vice-President; Dr. E. R. Ferguson, Secretary-Treasurer.

Campbell County Medical Society has elected Dr. J. L. Jeffernan, Jellico, President; Dr. S. D. Queener, Jacksboro, Vice-President; Dr. F. A. McClintock, re-elected Secretary-Treasurer.

(Continued on page 46)

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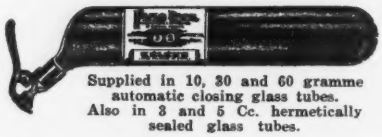

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(Continued from page 44)

Carroll County Medical Society has elected Dr. S. W. Huffman, President; Dr. J. D. Todd, Secretary. Both reside at McKenzie.

Gibson County Medical Society has elected Dr. B. T. Bennett, Trenton, President; Dr. George E. Spangler, Humboldt, Secretary-Treasurer.

Greene County Medical Society has elected Dr. Claude P. Fox, Jr., President; Dr. L. E. Coolidge, Greeneville, Vice-President; Dr. H. A. Blanton, Memphis, Secretary-Treasurer.

Hawkins County Medical Society has elected Dr. R. A. Doty, Rogersville, President; Dr. J. S. Lyons, Rogersville, re-elected Secretary-Treasurer.

Henry County Medical Society has elected Dr. R. J. Perry, Springville, President; Dr. J. T. Bomar, Mansfield, Vice-President; Dr. J. T. Freeman, Paris, Secretary.

Loudon County Medical Society has elected Dr. W. D. Padget, President; Dr. Halbert Robinson, Vice-President; Dr. J. G. Eblen, Secretary-Treasurer. All reside at Lenoir City.

McMinn County Medical Society has elected Dr. J. R. Nankivell, Athens, President; Dr. W. S. Moore, Etowah, Vice-President; Dr. E. M. Akins, Etowah, Secretary-Treasurer.

Obion County Medical Society has elected Dr. J. C. Walker, Obion, President; Dr. C. B. A. Turner, Union City, Vice-President; Dr. Mark Butler, Union City, Secretary-Treasurer.

Stones River Academy of Medicine has elected Dr. Mayne B. McCrary, Woodbury, President; Dr. H. S. Mustard, Murfreesboro, Vice-President; Dr. J. I. Waring, Murfreesboro, Secretary-Treasurer.

Washington County Medical Society has elected Dr. W. J. Matthews, Johnson City, President; Dr. C. H. Hyker, Johnson City, Vice-President; Dr. C. W. Friberg, Johnson City, Secretary-Treasurer.

The College of Medicine of the University of Tennessee announces that, beginning with the session of 1927-1928, post-graduate courses for physicians will be offered in the following: Otolaryngology, ophthalmology, pulmonary tuberculosis, roentgenology, blood

(Continued on page 48)

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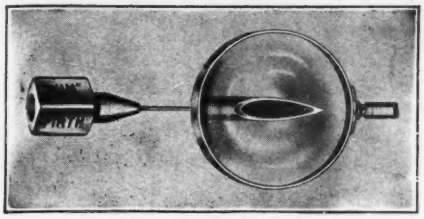

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	22	1⅛ "	3.00 "
	22	2 "	3.50 "
	21	1¼ "	3.00 "
	21	3 "	4.50 "
	20	1 "	3.00 "
	20	1½ "	3.00 "
	20	4 "	5.50 "
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Manhattan Eye Salve Company

Louisville, Kentucky.

(Continued from page 46)

diseases, orthopedic surgery, diseases of the chest, diseases of the heart, gastroenterology, gynecology, obstetrics, pediatrics, dermatology and syphilology, and urology.

The medical library of the late Dr. George M. Burdett was presented by his widow to the Knoxville Health Center for the use of physicians of that city and vicinity, instead of to Nashville, as was noted in the May Journal. This is the initial contribution to a medical library which is to be established in Knoxville, and since the gift was announced, Dr. C. M. Capps, formerly of Knoxville, but at present with the Veterans' Bureau Hospital, Aspinwall, Pa., has donated his medical library to the Knoxville Health Center.

Dr. M. Smith, Ardmore, is now with the Holy Name Hospital, Teaneck, N. J.

Dr. H. M. Cass was recently elected President of the Appalachian Hospital, Johnson City.

Dr. R. S. Cunningham, Professor of Anatomy of the Vanderbilt Medical School, has been appointed Chairman of the Vanderbilt Medical Society.

Dr. Sidney C. Burweck, Associate Professor of Medicine of the Vanderbilt Medical School, has been elected Secretary of the Vanderbilt Medical Society.

Dr. Lyle B. West, Chattanooga, and Miss Henrietta Adams, New York, N. Y., were married February 6.

Deaths

Dr. W. W. Foust, Robbins, died March 7.

Dr. R. Henry Milan, Lexington, aged 55, died in March.

Dr. Mary Elizabeth George, Memphis, aged 68, died March 1 of cerebral hemorrhage.

Dr. McMinn M. Pearson, Bristol, aged 63, died April 9 of angina pectoris.

TEXAS

Bosque County Medical Society has elected Dr. J. H. Burnett, Kopperl, President; Dr. C. C. Cate, Morgan, Secretary-Treasurer.

(Continued on page 50)

REST **RECREATION** **RECUPERATION**

Hot Springs National Park, Arkansas

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(Under the control of the Interior Department)

The attention of the American Medical Profession is invited to the great benefits to be derived from the use of the radio-active waters of Hot Springs in the treatment of diseases where rapid elimination is desired such as, arthritis, neuritis, malaria, affections of the skin and other diseases resulting from toxemias and microbic infection.

The resort is provided with a number of modern and luxurious bath houses, hotels, apartments and boarding houses.

Pleasures and amusements in the way of golf, tennis, mountain climbing, horseback riding, fishing and hunting are provided for our guests and visitors.

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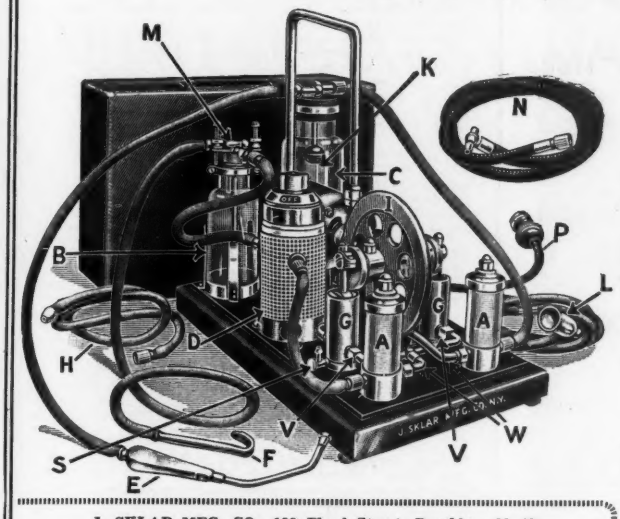

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You can regulate the speed of the motor under all conditions.

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A warm stream of air can be automatically fed through the ether bottle, preventing freezing of the ether.

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It will not creep or walk during the operation or while in use.

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Surgical Instruments and
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Laboratory Apparatus

I. L. LYONS & CO., Ltd.
Established 1866
NEW ORLEANS

(Continued from page 48)

Jones County Medical Society has elected Dr. A. McK. Jones, President; Dr. J. T. Bynum, Vice-President; Dr. C. H. Hendry, Secretary-Treasurer.

The Southwest Texas District Medical Association met at Lufkin April 7-8.

Several physicians of the neighboring towns met with the Grapevine physicians February 18 and organized a Medical Society for the Country Doctor. The purpose of the meeting was to discuss the various problems confronting the future welfare of the country doctor. Dr. J. C. Bennett, Grapevine, was elected President; Dr. W. F. Perkins, Grapevine, Vice-President; Dr. Monroe Gilbert, Irving, Secretary. Drs. E. W. Burnett, Carrollton; E. T. Read, Keller, and W. C. Weir, Lewisville, were appointed as a committee to draft rules and regulations for the organization.

Governor Moody recently announced the appointment of the following physicians as members of the State Board of Health: John C. Thomas, Austin; A. A. Ross, Lockhart; William A. King, San Antonio; Elbert W. Wright, Bowie; Charles M. Rosser, Dallas; Jacob M. Frazier, Belton. Dr. James C. Anderson, Plainview, who was formerly appointed, is President of the Board.

Up to March 22 there had been sixty-two cases of smallpox this year at Wichita Falls, or more than four times the number of cases for the entire year of 1926.

Dr. H. E. Nicholson has announced plans for a modern, completely equipped hospital for Wheeler.

The Dallas County Medical Society has issued an appeal to the people of Dallas for the completion of the Dallas Sanitarium. About $125,000 is yet to be subscribed. The City has given approximately $70,000. Towns outside Dallas in the North Texas Conference will give approximately $50,000. The $250,000 for which the teams are working is necessary if the hospital is completed and ready for use on May 1 as planned.

The King's Daughters' Hospital, Temple, will have a three-story addition which will cost approximately $105,000. Work will start in the near future.

(Continued on page 52)

Laboratories of

Drs. Bunce, Landham and Klugh

ATLANTA, GEORGIA

George F. Klugh, M.D., Director, Laboratory of Clinical Pathology
Jackson W. Landham, M.D., Director, Laboratory of Radiology (X-Ray and Radium)

These laboratories are equipped for making every test of clinical value in the diagnostic study of medical and surgical cases. Only standardized methods and technique are used.

In addition to the diagnostic study of cases there are adequate facilities for the x-ray and radium treatment of conditions in which these forms of treatment are indicated.

Containers for pathological specimens and information in reference to x-ray and radium work furnished upon request.

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Now costs no more than other antitoxins. Welcome news. It means you can use SUPER-CONCENTRATED ANTITOXIN in all your diphtheria cases at no greater cost.

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Supplied, ready for instant use, in the Mulford Perfected Antitoxin Syringe, the ideal injecting device.

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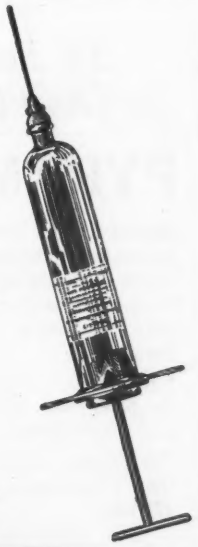

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There is a constant drain of mineral salts, tending to mineral starvation and "acidosis". (Fischer, Losee, Van Slyke, etc.).

Combat acidosis in pregnancy with Kalak Water. Prescribe in sufficient amounts to keep the urine always neutral.

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Repeated tests have shown that *The Dependable Original* PYRAMIDON tablet disintegrates in 15 seconds. Such rapid disintegration explains, in part, the prompt efficacy of Pyramidon.

Indications: Headache, neuralgia, dysmenorrhea, myalgia, and the pains and aches of colds, etc.

For prompt analgesic results specify *The Dependable Original* PYRAMIDON.

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(Continued from page 50)

Dr. Bohls, Austin, succeeds the late Dr. J. C. Wilhite as head physician at the Pasteur Institute, Austin.

The Kaufman County Medical Society was recently entertained at a luncheon at the home of Dr. James W. Park, the President, in celebration of his fiftieth anniversary in the practice of medicine in Kaufman County.

Drs. L. E. Petty, J. H. Walker and O. York, Panhandle, have joined J. M. Sanford, Amarillo, in the operation of the Garland Hospital in that city. Mary Slimp is Superintendent of the hospital.

C. Q. Smith has been appointed Commissioner of the Methodist Hospital, Fort Worth, succeeding Dr. W. H. Matthews.

Vivian E. Minck, R. N., formerly of the Virginia St. Hospital, Graham, is the new Superintendent of the Angelina County Hospital, Lufkin.

Deaths

Dr. N. B. Harris, Red Rock, aged 70, died March 15.

Dr. Thomas T. Smith, Bald Prairie, aged 67, died December 2 of carcinoma of the stomach.

Dr. Ofard Francis May, El Paso, aged 45, died March 16 of tuberculosis.

Dr. Clayton Reeves Speer, Malta, aged 50, died January 7 at a sanatorium in Kerrville of tuberculosis.

Dr. Drury Young Stem, Slidell, aged 64, died recently of pneumonia and heart disease.

Dr. Henry Thompson White, Hemphill, aged 52, died February 17 at Beaumont.

Dr. Walter T. McAmis, Roxton, aged 50, died March 9.

Dr. Chester E. Russell, Venus, aged 78, died March 29.

VIRGINIA

Arlington County Medical Society has elected Dr. H. A. Hornthal, Potomac, President; Dr. Edward McCarthy, Cherrydale, Vice-President; Dr. B. H. Swain, Ballston, Secretary-Treasurer.

(Continued on page 54)

Summer Diarrhea

The following formula is submitted as a means of preparing suitable nourishment in intestinal disturbances of infants usually referred to as summer diarrhea:

Mellin's Food	**4 level tablespoonfuls**
Water (boiled, then cooled)	**16 fluidounces**

This mixture contains proteins, carbohydrates and mineral salts in a form readily digestible and available for immediate assimilation.

The need for protein is well understood as is also the value of mineral salts, which play such an important part in all metabolic processes. Carbohydrates are a real necessity, for life cannot be long sustained on a carbohydrate-free diet. It should also be stated that the predominating carbohydrate in the above food mixture is maltose—which is particularly suitable in conditions where rapid assimilation is an outstanding factor.

Above all is the satisfactory result from the use of this suggested nourishment, which is well supported by clinical evidence.

Mellin's Food Company, 177 State Street, Boston, Mass.

IN THE MANAGEMENT OF THE DYSPEPTIC INFANT...

WHERE the food tolerance is lessened and where there is no regular gain in weight, the use of

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is of great advantage. By virtue of the fact that the quantity of water may be diminished ad libitum, the physician may readily obtain a concentrated diet of high caloric value. The fineness of the DRYCO curd assures its maximum assimilation and absorption with a minimum of digestive effort. In view of its palatability, dyspeptic infants readily adapt themselves to DRYCO, showing at the same time, a marked improvement in appetite and weight.

Weight Chart and Clinical Data will gladly be mailed to the physician upon request.

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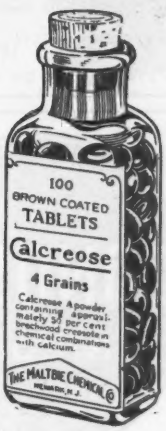
ELIMINATES OBJECTIONS TO CREOSOTE

CREOSOTE has long been used as an intestinal antiseptic as well as for its effect on pulmonary inflammations such as influenza, bronchitis, and tuberculosis.

Calcreose eliminates the usual objections to creosote. It is a chemical combination of creosote and hydrated calcium oxide from which the creosote is slowly liberated, thus aiding absorption and toleration.

Calcreose can be given in large doses for long periods without apparent difficulty.



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Cottage sanitarium for the treatment of tuberculosis.

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Price $39.00

This instrument lends itself equally to the Pathologist in the Hospital and to the practicing Physician.

The application and the technic of examination are described in all works of Hematology and Clinic Diagnosis.

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Electric Centrifuges

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253 Western Ave., Boston, Mass.

(Continued from page 52)

Botetourt County Medical Society has elected Dr. Arthur W. Hammond, Amsterdam, President; Dr. E. W. Dodd, Buchanan, Secretary.

Southside Virginia Medical Association met in Hopewell March 8. Dr. Wright Clarkson, Petersburg, is President; Dr. R. L. Raiford, Secley, Secretary-Treasurer.

The Southwestern Virginia Medical Society held its regular semi-annual meeting at Pulaski March 24-25.

The Richmond Pediatric Society at its regular meeting March 31 elected Dr. Howard Urbach, President; Dr. Basil B. Jones, Vice-President; Dr. W. Ambrose McGee, Secretary-Treasurer.

At the recent meeting of the Rappahannock Valley, Inc., at Tappahannock, the following doctors were among those selected as directors: Dr. H. A. Tabb, Gloucester; Dr. J. H. Lowe, Welcome; Dr. F. W. Lewis, Morattico.

Norfolk County Medical Society gave a dinner recently on the occasion of the fifty-fifth anniversary in the practice of medicine of Dr. Robert S. Perkins.

The Walter Reed Memorial Commission of the Medical Society of Virginia at its meeting in Richmond in April adopted a resolution empowering its Chairman, Dr. E. C. S. Taliaferro, Norfolk, to appoint local chairmen in the various sections of the State to raise $2,500 for the restoration and fencing in of Belroi, home of Walter Reed in Gloucester County. The Medical Society of Virginia, at its annual meeting last fall, appropriated money for the purchase of this home, but the house is in need of repairs on account of disintegration from time and souvenir hunters.

The Arlington County Medical Society has endorsed the movement of the American Legion to establish a hospital in that county.

In 1924 a special school for over-age pupils from the various colored schools of Norfolk was established and named in honor of the Negro poet, Paul Lawrence Dunbar. Pupils of normal intelligence who will probably have a chance to go to high school are given special coaching to that end, and for the others the regular curriculum is supplemented, the girls being taught cooking, sewing, laundry work and household management, and the boys carpentry and cobbling. The school also has an open-air room for children who are subnormal physically or show tendencies toward disease.

Dr. Gladys Smithwick, Roanoke, who was to have left for China for medical missionary work in February, has had her sailing indefinitely postponed because of the present state of affairs in China. She has accepted a position as Assistant Physician at the Western State Hospital, Staunton.

Dr. William C. Gibson, Suffolk, has been elected Commander of the Suffolk Post, American Legion.

Dr. S. G. Miller, Bacova, is now physician for the Tidewater Hardwood Corporation.

Dr. Conway Hiden, Resident Obstetrician and Gynecologist at the University of Virginia Hospital, has gone to Burdine, Kentucky, where he has accepted a position as Surgeon to the Consolidation Coal Company.

Dr. B. B. Dutton, Winchester, has been appointed

(Continued on page 56)

GONOSAN
"RIEDEL"

The Distinctive Properties of Gonosan

Inhibits gonococcal development and minimizes its virulence.

Aids in reducing the purulent secretion.

Encourages normal renal activity.

Relieves the pain and strangury and allays the irritation and inflammation.

Does not irritate the renal structure or the digestive organs.

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A WEALTH OF CLINICAL OBSERVATIONS SUBSTANTIATES THE CLAIM

CAPROKOL

(Hexylresorcinol, S & D.)

AFFORDS QUICK RELIEF IN URINARY INFECTIONS.

PAINFUL FREQUENT URINATION SUBSIDES. THIS RESULTS IN HOURS OF UNBROKEN REST. FEVER DISAPPEARS, THE APPETITE IMPROVES, WEIGHT IS GAINED. THE URINE CLEARS AND FINALLY, COMPLETE STERILIZATION OF THE URINARY TRACT IS ACCOMPLISHED, SOMETIMES WITH AMAZING RAPIDITY AND OFTEN WITHOUT OTHER TREATMENT OF ANY KIND.

UNLIKE MANY URINARY ANTISEPTICS, CAPROKOL DOES NOT IRRITATE THE BLADDER MUCOSA EVEN WHEN GIVEN IN MAXIMUM DOSES AND IS EQUALLY EFFECTIVE IN ACID OR ALKALINE URINE.

NOTE:—The efficacy of CAPROKOL depends to some extent upon its property of reducing the surface tension of the urine. Diuretic drugs, including Sodium Bicarbonate, and large quantities of fluids increase the surface tension of the urine, and should not be employed during treatment with CAPROKOL (Hexylresorcinol, S & D.).

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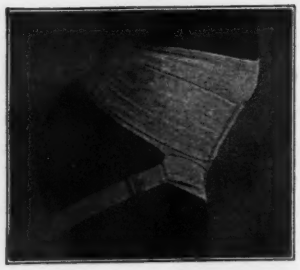

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KATHERINE L. STORM, M.D.,
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(Continued from page 54)

a member of the Executive Council of the Medical Society of Virginia from the Seventh Congressional District. He succeeds Dr. Walter Cox, deceased.

Dr. J. Walter Layman, has been appointed in charge of the South Boston General Hospital, South Boston.

Dr. Charles Perry Howze, Danville, and Miss Hannah Morris Keith, Fairfax, were married March 19.

Dr. S. E. Hughes, Jr., Danville, and Miss Sarah Hall, Onancock, were married March 19.

Deaths

Dr. George A. Wood, Earlysville, aged 91, died in January of cerebral hemorrhage.

Dr. John H. Robinson, Jr., Newport News, aged 38, died March 26 at Hampton of pulmonary tuberculosis.

WEST VIRGINIA

Eastern Panhandle Medical Society has elected Dr. C. C. Johnson, Harper's Ferry, President; Dr. Ernest H. Bitner, Vice-President; Dr. A. B. Eagle, Martinsburg, Secretary.

Summers County Medical Society has elected Dr. J. F. Bigony, President; Dr. R. G. Broaddus, re-elected Secretary-Treasurer. Both reside at Hinton.

Up to March 19 there were more than forty cases of smallpox reported in Logan County.

Dr. James Whann McSherry, Martinsburg, aged 94, and still actively engaged in practice of medicine, has been elected an honorary member of the West Virginia Medical Association.

Dr. William H. McLain, Wheeling, has been reappointed County Health Officer.

Mr. Sterrett O. Neale has resigned his position with the West Virginia Medical Journal and has been succeeded by Mr. Joe W. Savage.

Deaths

Dr. Patrick Henry Swann, Huntington, aged 68, died at Orlando, Fla., in March of cerebral hemorrhage.

Dr. James William Livesay, Mount Clare, aged 42, died March 19 at St. Mary's Hospital, Clarksburg, of heart disease.

Dr. Orlando Worthington Lusher, Point Pleasant, aged 69, died March 11 of heart disease.

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LOESER'S INTRAVENOUS SOLUTIONS
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"Glucose solution given intravenously is the best remedy for postoperative shock, dehydration, toxic absorption and even a generalized septic infection." *(Jr. of the Med.. Soc. of N. J., Feb., 1927.)*

Loeser's Intravenous Solution
OF
Glucose

A standardized, sterile, stable 50% solution of glucose of neutral reaction, in 20 c. c. and 50 c. c. hermetically sealed ampoules. Free from preservatives.

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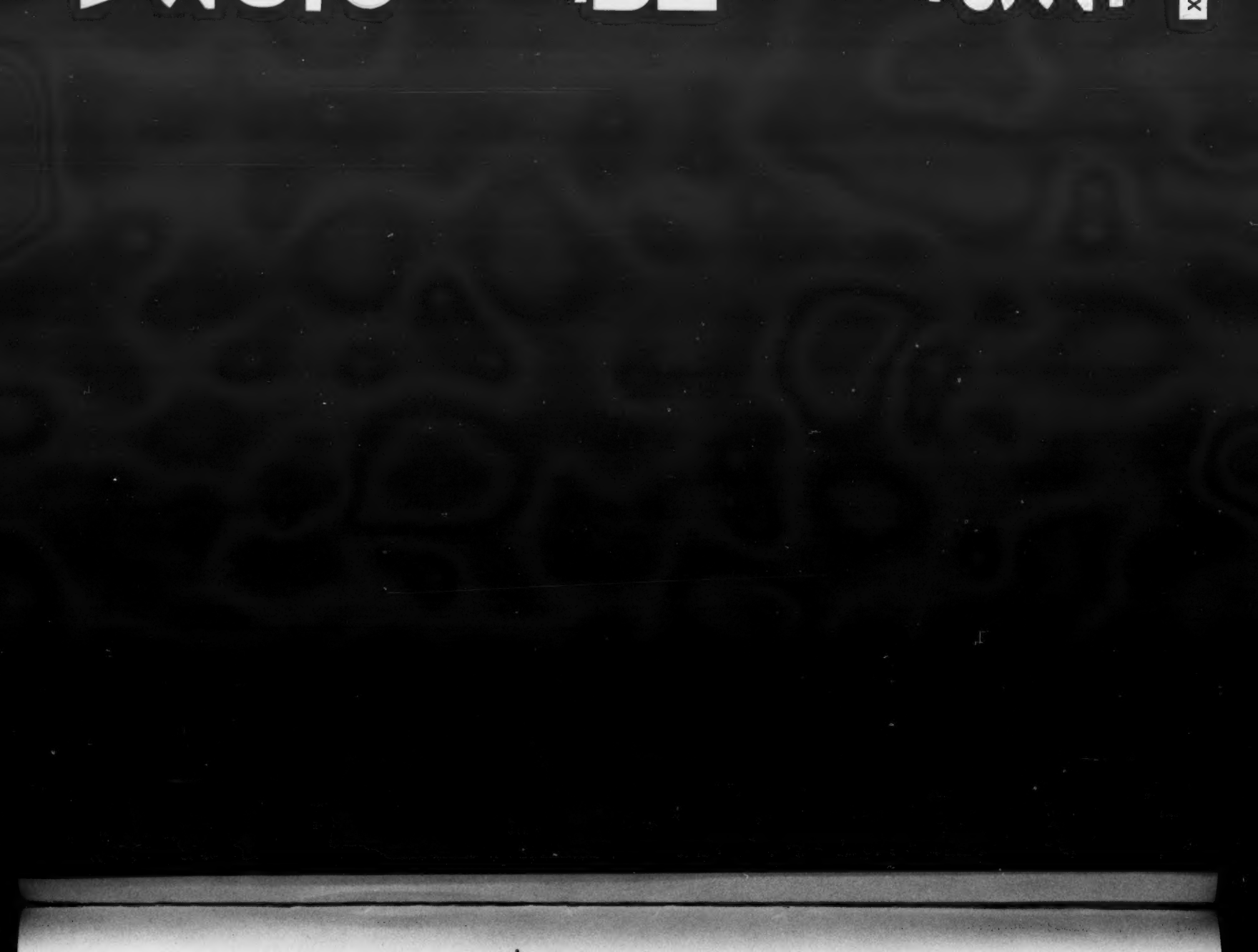

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MEAD'S infant diet materials are advertised only to physicians. No feeding directions accompany trade packages. Information in regard to feeding is supplied to the mother by written instructions from her doctor, who changes the feedings from time to time to meet the nutritional requirements of the growing infant. Literature furnished only to physicians.

Samples and literature on request.

The Trend in Modern Infant Feeding

THE trend in the bottle feeding of infants has been toward simplicity. From Biedert in 1869 until the present, physicians have cautiously felt their way through "periods" and "principles", the various steps having as their significance to determine:

1ST—the metabolism of infants.

2ND—the caloric values of the dietary materials used.

3RD—the physio-chemical differences between cow's milk and breast milk.

Heretofore cow's milk modifications have been effected largely by simple dilution and additions in the hospital or home. Recolac is cow's milk scientifically *reconstructed.* It is not a duplicate of breast milk. It is cow's milk—disintegrated—reconstructed, approximating breast milk chemically and physically more closely than can be accomplished by ordinary modifications.

So Recolac has followed—in a straight line—the trend of modern infant feeding

MEAD JOHNSON & COMPANY

EVANSVILLE, INDIANA, U. S. A.

MAKERS OF INFANT DIET MATERIALS

TETANUS ANTITOXIN

P. D. & CO.

Potent—Refined—Concentrated

THROUGH years of biological research we have developed certain refinements in the manufacture of Tetanus Antitoxin that enable us to offer to the medical profession a product which, we feel confident, stands alone in point of quality.

Tetanus Antitoxin, P. D. & Co., is supreme in these important particulars: smallness of volume, rapidity of absorption, water-white clearness, and fluidity.

And still another point,—on account of the small content of protein and total solids, the risk of producing serum sickness or other form of protein disturbance from its use is slight.

Nor must we forget the new design syringe container. It is easy to manipulate, even under the most trying conditions.

Physicians who specify *Tetanus Antitoxin, P. D. & Co.,* are assured of these outstanding advantages.

Tetanus Antitoxin, P. D. & Co., is supplied in a dose of 1500 units in bulb and syringe containers for prophylaxis, and in doses of 3000, 5000, 10,000 and 20,000 units in syringe containers for treatment.

PARKE, DAVIS & COMPANY

[*United States License No. 1 for the Manufacture of Biological Products*]

DETROIT, MICHIGAN

TETANUS ANTITOXIN, P. D. & CO., HAS BEEN ACCEPTED FOR INCLUSION IN N. N. R. BY THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION